THE LEADING UK CONSUMER ELECTRONICS TECHNOLOGY MAGAZINE

TELEVISION

SERVICING · VIDEO · SATELLITE · DEVELOPMENTS

A REED BUSINESS PUBLICATION

SEPTEMBER 1997 £2.50

Repairing PC Monitors

Test Report: The Channel Master Sat Signal Meter

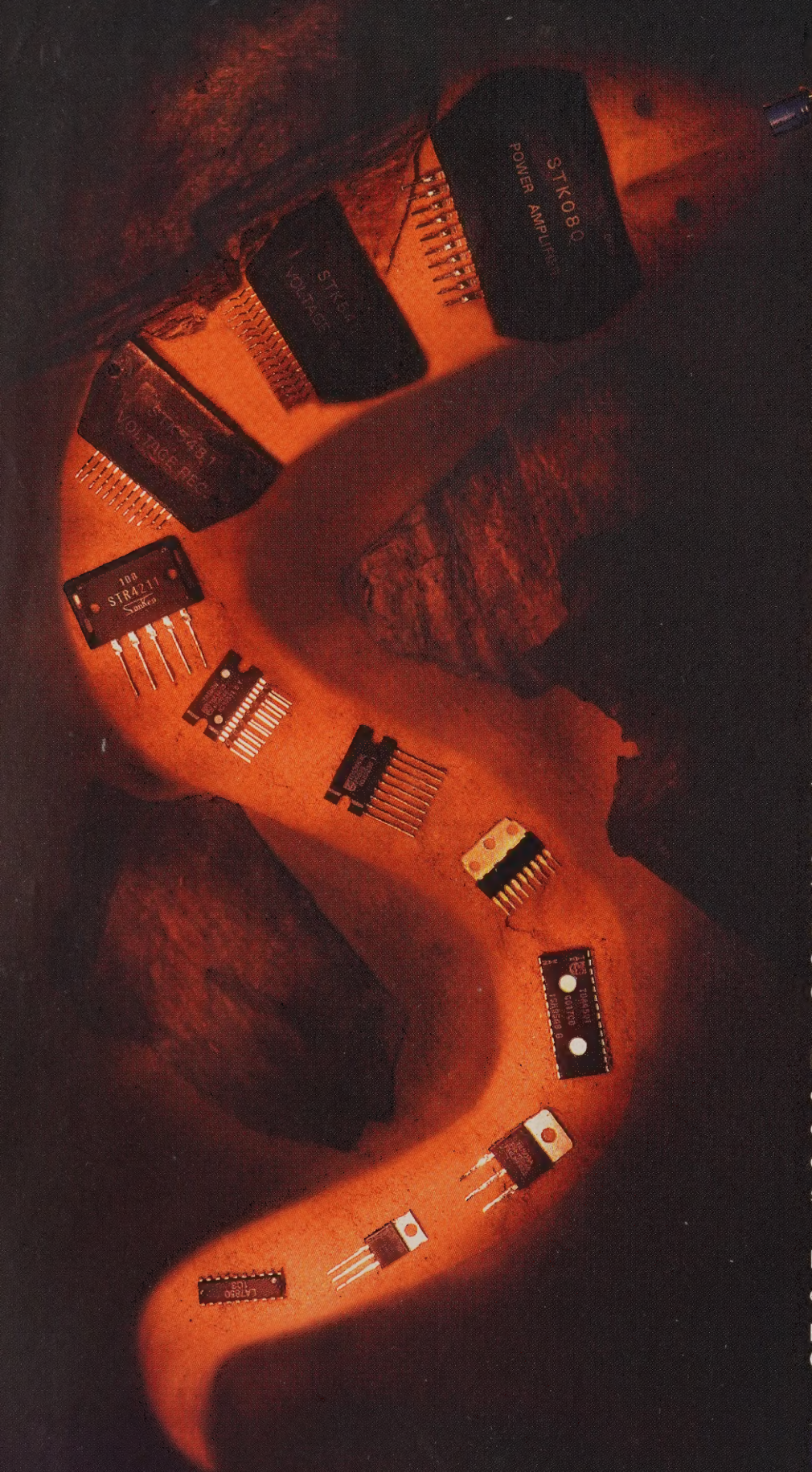
Dolby Digital and Virtual Surround

Who will service digital TV?

Servicing the Tatung 190/195 chassis

9 770032 647078 09>

Fault Reports *TVs, VCRs, Camcorders and Satellite*



Do you feel special?

You will when you do business with Philex

Our customers have asked us s many times to expand our rang of semiconductors that we hav set up a whole new department t cater for their requests.

In the last few months we hav expanded our range of sem conductors from 600 lines to 5

Our excellent sourcin capabilities and flexible turn around times mean we can ofte find that elusive part on reques All part of the customer service w have developed to meet your needs

To make your life easier, we hav updated the facilities on our new CD ROM catalogue.
This comprehensive referenc source is available to you FRE OF CHARGE. Just call us now o 0181 202 1919 for your copy.

For up to the minute informatio on semiconductor availability yo can now call up our new semicon ductor pages on the Philex We site:http://www.philex.com

For details of your local supplie of Philex semiconductors, simpl phone our sales office now, o 0181 202 1919

PHILEX
PLC

QUALITY ASSESSED
ASA
ISO 9002
CERT NO. 12702

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

CONTENTS

September 1997 VOL. 47, NO. 11

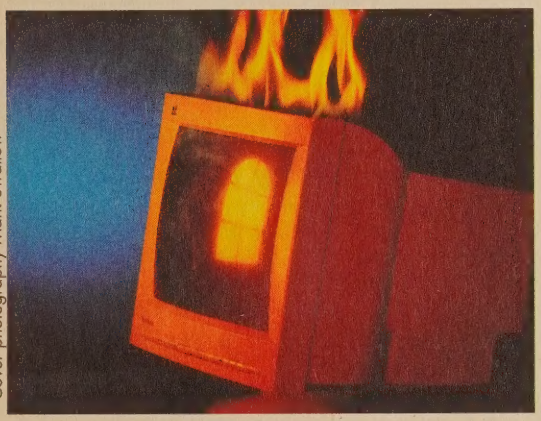
False Alarm? 771

Teletopics 776
End of recommended retail prices and other news.

Camcorner 778
Camcorder servicing hints and fault reports.

VCR Clinic 780

Servicing Computer Monitors 783
Russ Phillips on monitor and TV receiver differences that can cause difficulties for those more used to TV sets.



Cover photography Mark Swallow

Test Report 784
Mike Hancox reviews the Channel Master 1005IFD satellite signal level meter.

A Visit to Dolby Laboratories 786
George Cole on the latest developments from Dolby, including Dolby Digital and Virtual Dolby Surround.

Satellite Workshop 790
Jack Armstrong's column on satellite receiver servicing.

Test Case 417 791

Servicing in the Digital Age 792
Eugene Trundle reports on the recent RETRA servicing conference that was mainly concerned with the changes that digital TV technology will bring.

TV Fault Finding 796

What a Life! 800
Donald Bullock on past and present problems in the brown goods servicing trade.

Monitor Faults 802
Tips on computer monitor repairs.

Help Wanted 815

Servicing the Salora M Chassis 816
This month Chris Watton describes the digital audio and video processing circuitry, fault finding, and adjustment plus setting up procedures.

Satellite Notebook 820
Problems with satellite equipment and installations.

Servicing the Tatung 190 series chassis 822

John Coombes provides an updated rundown on fault-finding checks for these popular sets.

Competition 825
Win an Ozan Teletest PC pattern generator.

Long-distance Television 826
Terrestrial DX and satellite reception. News from abroad. Details of a high-performance VHF preamplifier. Roger Bunney reports.

Book Review 829

Letters 830

Next Month in Television 832

Editor
John A. Reddihough

Production Editor
Tessa Winford

Consultant Editor
Martin Eccles

Publishing Director
Susan Downey

Advertisement Manager
Carol Nobbs
0181-652 8330

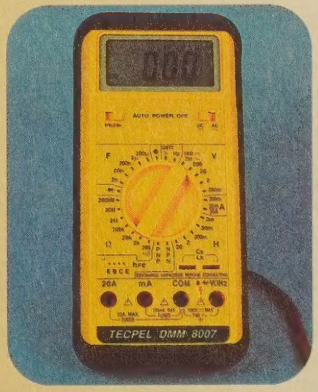
Advertisement Sales Executive
Pat Bunce
0181-652 8339
Fax 0181-652 8931

Editorial Office
0181-652 8120
Fax 0181-652 8956

Note that we are unable to answer technical queries over the telephone and cannot provide information on spares other than that given in our Spares Guide.

SPECIAL OFFER

Versatile dmm with *L*, *C* and *f* ranges for £69 – fully inclusive. This meter normally retails at £88.13, but Vann Draper is making this offer exclusively to *Television* readers. See page 775 for further specifications and how to order.



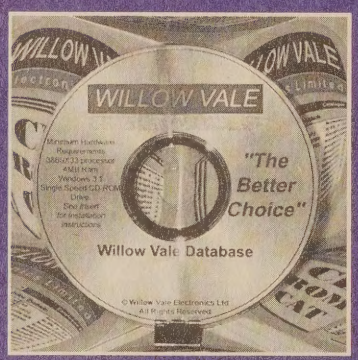
A WORLD OF SPARES

CD-Rom Revolution

The updated CD-Rom catalogue now contains even more information

587,000 Descriptions
351,000 Part Numbers
300,000 Products
3,000 Pictures

Now with interactive COPLINK giving up to the minute information and availability.



TECHLINE is always available. Should you require any technical help or advice on 0891 615915.
(*all calls charged at premium rate).

DE-ZINE-LINE, Willow Vale's FREE planning service designing your professional sound and communication system. Phone or Fax Gerry Bevan on 01635 254218.

C.O.P.S. computer ordering parts system via our 'viewdata' based order/enquiry system.

Call Willow Vale
0118 987 6444

Fax Willow Vale
0118 986 7188

Authorised Spares and Accessories Distributors for:

- Sharp
- Philips
- JVC
- Grundig
- Tatung
- Pace
- Nokia
- Matsui
- Ferguson
- Saisho

Genuine manufacturers' parts available for many other premium brands.

Sound and Security Division Distributors for:

- Adastra
- Altai
- Aiphone
- Audio Technica
- Audix
- Baldwin-Boxall
- Bose
- Computar
- Domineye
- Eagle
- ERL
- Goodmans
- Inkel
- Jamo
- Millbank
- Next Two
- Philips
- Secure Care
- Shure
- TOA
- Trantec
- Univox

WILLOW VALE
ELECTRONICS LIMITED

'The Better Choice'

READING HEAD OFFICE
Tel: 0118 986 0158
Fax: 0118 986 7188

MANCHESTER BRANCH
Tel: 0161 682 1415
Fax: 0161 682 9031

False Alarm?

Concern about the prospect of servicing the new generation of digital TV and video equipment is understandable. The new and unknown always seem to be something of a threat. Will we be able to cope? Or will we be totally out of our depth? Will completely new and unfathomable problems present themselves, making life even more difficult for the already hard-pressed service engineer? And will we be able to afford highly specialised new test gear? It's easy to become despondent, and there are always those who seem to want to dramatise what lies ahead.

There are good reasons not to be unduly worried however. For a start, what exactly is so new about the digital technology? We've had teletext for over twenty years now. Nicam and CD players have been with us for over a decade. We are used to microcontroller chips, memories and bus systems. Digital servo systems in VCRs are nothing new. Sets that process video and sound signals in digital form have been around for ten years now, though they never caught on (see Chris Watton's current articles on the Salora M chassis). Digital transmissions are no longer new to satellite enthusiasts, and don't seem to have caused any great problems. Most technicians will have had some dealings with computers.

What will be new is the arrival of a digital signal at the input to the tuner. But why should this be such a quantum leap, in view of teletext and Nicam? It will after all be a form of modulation, which will call for demodulation and decoding. These operations will be undertaken by those little black plastic things, quite likely just one of them (see Teletopics last month). We are used to a Nicam signal going into a chip to be sorted out, just as we are used to a composite analogue video signal going into a colour decoder chip to emerge in RGB form.

Digital chips don't frighten anyone nowadays. The checks to make when one is suspect are straightforward and logical. Is the supply getting to the relevant Vcc pin? Are there inputs and outputs? Are there pulses on the control lines? Is the clock working? Does the reset operate? And are any critical pulse feeds present? It takes longer than looking to see whether an EF80 is alight, but the fact that the technology has evolved naturally over the years means that most of us have got used to the idea of change, and the changes themselves.

You can be certain that the chip makers and set assemblers will have gone to great trouble to ensure that their devices and receivers work reliably, and that the associated circuitry will have the minimum of adjustments. They would be in awful trouble if they didn't. Since guarantees are mandatory, no manufacturer could afford to market equipment whose performance is uncertain. Improved manufacturing tolerances will mean that most adjustments can be designed out.

Yes, it will be a nuisance and unsettling to open up the back of a set or, more likely for the first few years, a set-top box and be confronted by unknown (initially) chips. But the systems and technology won't be completely new. Above all, a power supply will be required, and this is where most problems will arise. TV sets will require scanning, as always. Flat-screen displays, if and when their performance becomes good enough for them to compete with the CRT, will call for a different approach. But here again it will be a matter of checking that drive pulses and supplies are present.

The technicians who will be really in at the sharp end will be those with responsibility for in-guarantee repairs. But these are basically down to the manufacturers and their specialist agents. They will crack any problems and issue modification details as necessary. The idea that the average workshop will have to invest in tens of thousands of pounds worth of equipment is a nonsense. But if the worst did come to the worst and there were lots of problems, the traditional workshop could provide a screening service, dealing with the vast majority of relatively simple faults and sending the more intractable ones to specialist centres. In practice it's likely that the most trying problems will continue to be surface-mounted devices, complex/compact modules and difficulty in getting at and into equipment. Nothing all that new here either.

To start with, digital TV reception will for most people be a matter of using a set-top box. Such devices lead a relatively stress-free life. It's when the digital circuitry gets in amongst the EHT and hefty current flows in a TV set that chip failures accelerate. This is again a design problem.

We've survived change and the introduction of new and novel electronic techniques and systems in the past. There is no reason to suppose that this will suddenly alter. Having said all that, I feel better already!

COPYRIGHT
© Reed Business Information Ltd., 1997. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the written permission of the publishers.
All reasonable precautions are taken by *Television* to ensure that the advice and data published are reliable. We cannot however guarantee it and we cannot accept legal responsibility for it.

CORRESPONDENCE
All correspondence regarding advertisements should be addressed to the Advertisement Manager, "Television", Reed Business Information, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Editorial correspondence should be addressed to "Television", Editorial Department, Reed Business Information, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

INDEXES AND BINDERS
Indexes for Vols. 38 to 46 are available at £3.50 each from SoftCopy Ltd., who can also supply an eight-year consolidated index on computer disc. For further details see page 833.
Binders that hold twelve issues of *Television* are available for £6.50 each from Television Binders, 78 Whalley Road, Wilpshire, Blackburn BB1 9LF. Make cheques payable to "Television Binders".

BACK NUMBERS
Some back issues are available at £2.75 each. For further details see box on page 795.

SUBSCRIPTION ENQUIRIES

Telephone:	01444 445 566
Fax:	01444 445 447
Credit card orders:	01622 778 000

Address: Television, Subscriptions Dept, PO Box 302, Haywards Heath, West Sussex RH16 3YY, UK.
Make cheques payable to: Television
Subscription rates:

UK	£30.00 per year
Airmail Eire	£34.00 per year
Airmail Europe	£43.00 per year
Airmail Rest of World	£56.00 per year

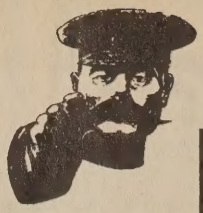
NEWSTRADE ENQUIRIES
Distributed by MarketForce
Telephone: 0171 261 7704

WEB SITE
For a full list of RBI magazines:
http//www.reedbusiness.com

ISSN **0032-647X**

REED BUSINESS INFORMATION

YOU!! NEED ECONOMIC



Thousands of semiconductors I.C's etc.
of video parts, heads, belt kits etc.
of remote controls. etc. etc.

over 100,000 database records to help find the difficult video parts quickly. Stock availability & price in seconds

We compete on **QUALITY** - We compete on **SERVICE**
We will not compromise and yet our prices are often less.

.....and look at the special offers..... (strictly while stocks last)

REGBABY10 each	£13.00		TEA2018A	X 5	£5.75		STK5481	X 2 £10.00
BU208A	X 5 £3.75		BUT11AF	X 5	£2.75		STR50103	X 2 £5.90
BU508A	X 5 £4.15		BUT11A	X 5	£1.75		S2000AF	X 5 £5.25
BU508AF	X 5 £3.50		CNX62A	X 5	£3.00		TDA3653B	X 2 £1.80
BU508D	X 5 £4.45		UC3842	X 5	£2.95		TDA3654	X 2 £1.80

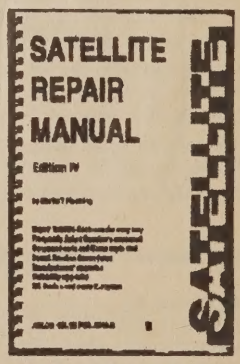
Philips type 1.2 volt Back up battery	X 5	£4.50
Philips type 2.4 volt Back up battery	X 5	£8.75
Scart - Scart lead 1.5m Fully wired	X 2	£2.90
Standard video sensor lamp	X10	£2.50
Std video sensor lamp + plug	X10	£4.00
3V29 etc. Belt kit	X 5	£4.50
3V35/36 etc. Belt kit	X 5	£4.25
VT11E etc. Belt kit	X 5	£5.50
Positor PT37,TH98009 (White)	X 5	£4.75
Thorn TX100 Green spot LOPTX	each	£12.95

(please add £1.00 handling all + VAT)

.....and now ask for a full price list.

Satellite division Satellite division Satellite division Satellite division

"The Satellite Repair Manual"



You could say that what Martin Pickering doesn't know about satellite receivers isn't worth knowing. What he does know has become legendary. Having been at it since the start of consumer satellite TV, he has built up a massive data base on satellite receivers. Not only on their faults, common and less common but also on modifications and upgrades. Martin brings in-depth expertise to the subject, having previously been involved with equipment reliability testing and component specification. This book has become established as a bible for satellite TV repair. But the subject doesn't stand still. New models, new faults - there is always something to add, So here we have the fourth edition, which has been completely updated and now has 240 pages - the previous edition had 135. In addition to receiver fault notes and general information you'll find many useful button sequences for resetting parental lock codes, resetting installation choices to factory defaults and other less well known operations, practical information on LNBs with typical current drains, a list of manufacturers and suppliers addresses and other useful material, all presented in a nice Wire-O binding so that the book lies flat on the bench.

Recoup the cost with your first repair! **£16.95**

Satellite division Satellite division Satellite

PSU repair - refurb kits

Over **120,000** *kits sold*

KIT1 £6.95 Pace - PRD800,PRD900,PSR800,PSR900, Ferguson SRD5,SRD16,Grundig STR1, Maspro SRE250S/1,350S/1, Philips STU802/05M, Manhattan 850,950 Goodmans ST700, Toshiba TU-SD200,SAT99
KIT2 £6.95 Pace - SS900,9200,9210,MRD920, Ferguson SRV1, Grundig GIRD2000,3000, Philips STU801, Network 900,9200, Bush IRD150, Nokia SAT1500, Maspro SRE250S,350S,450S,Alba SAT6600, Finlux SR5700, Thompson SRS4
KIT3 £6.95 Amstrad - SR510,520,540,SRDR45,SRD550
KIT4 £6.95 Amstrad SRD 500
KIT5 £6.95 Amstrad SRX320,340 etc (export models)
KIT6 £6.95 Pace D100,120
KIT7 £6.95 Churchill D2MAC decoder
KIT8 £5.95 Pace MSS100
KIT9 £9.45 Pace MSS200,300,Apollo
KIT10 £13.11 Pace MSS500,1000
KIT11 £5.95 Ferguson SRD4
KIT12 £16.45 Echostar SR5500(early PSU with adjuster)
KIT13 £29.71 Echostar SR6500,7700,8700
KIT14 £23.95 Amstrad SRD600
KIT15 £7.36 Mintec (Sorenson PSU type only)
KIT16 £5.95 Amstrad SRD700,SR950,SRX100,301,501,1002,2001,SRD2000,SAT250

Please add £1 handling all + VAT

Economic Devices

32 Temple Street, Wolverhampton, WV2 4AN, UK Tele ++ 44 (0)1902 773122 Fax ++ 44 (0)1902 29052

http://www.telepart.demon.co.uk

Possibly a **FIRST AGAIN**, you can search our www site for video spares, semiconductors, remote controls, satellite gear, line output transformers and CCTV components. Its simple and will only **cost the price of a local call.** You can order parts, enquire about parts, or simply send a message. All at **the cost of a local call.** If you don't have the gear to access the internet get straight in touch with your local computer supplier or ask us for a fact sheet.

have you got HASSLE ! !

USE your ACCESS or VISA

Economic supply TV & Video parts very very Fast

Our experienced staff *WANT WANT* WANT to help you
We can give you an instant answer from our database which contains over *100,000* references and we can give that answer *IN SECONDS*
If we can't find it immediately, we will *HASSLE & HASSLE* our supplier, *HASSLE* the manufacturer. We will make phone call after phone call, and Fax after Fax on your behalf. *WE WILL DO ALL THIS FOR YOU.*
We do it willingly and for FREE. *YOU NEED ECONOMIC !!*

1N4001	0.03	2SC2274	0.35	AA119	0.36	BC557	0.09	BT151500R	1.12	BZX6122	0.19	MAX232CPE	4.70	TA7281P	3.20	TDA3654Q	2.82
1N4002	0.04	2SC2335	1.12	AC127	0.71	BC557B	0.18	BT151800R	1.15	BZX612V4	0.07	MC13002P	7.69	TA7698AP	5.97	TDA4500	4.66
1N4003	0.03	2SC2458	0.84	AD162	0.96	BC558B	0.18	BU208A	1.46	BZX6133	0.19	MC7812CT	0.77	TA7778P	5.11	TDA4501H	9.57
1N4004	0.11	2SC2482	0.35	AF127	2.48	BC558C	0.09	BU208D	1.61	BZX6136	0.19	MJ15003	2.23	TA8205AH	4.50	TDA4503	4.00
1N4005	0.06	2SC2570A	0.38	AN5265	1.76	BC559B	0.14	BU2508AF	1.58	BZX613V9	0.14	MJ2955	0.77	TA8210AH	0.00	TDA4505E	7.35
1N4006	0.06	2SC2655	0.31	AN5512	1.76	BC560C	0.11	BU2508DF	1.58	BZX615V6	0.11	MJ802	2.91	TA8210H	4.79	TDA4505M	11.97
1N4007	0.04	2SC2705	0.35	AN5515	2.79	BC635	0.23	BU326A	1.36	BZX6168	0.11	MJE13005	0.86	TA8215H	4.96	TDA4510	2.74
1N4148	0.06	2SC2785	0.36	AN5521	1.66	BC636	0.14	BU406	0.69	BZX616V2	0.11	MJE18004	2.05	TA8216H	8.01	TDA4580	10.05
1N5062	0.14	2SC3225	0.60	AN5601K	9.74	BC637	0.11	BU426A	0.86	BZX616V8	0.19	MJE3055T	0.45	TA8221H	0.00	TDA4600	2.14
1N5401	0.14	2SC3330	0.52	AN7171K	5.56	BC639	0.21	BU500	1.41	BZX617V5	0.09	MJE340	0.45	TA8403K	2.31	TDA4600/2/3	2.82
1N5402	0.14	2SC3400	0.17	AN7190K	11.11	BC640	0.11	BU500S	2.05	BZX618V2	0.19	MJF18004	2.05	TA8427K	3.76	TDA4601	1.46
1N5404	0.13	2SC3423	0.60	BA157	0.09	BC846B	0.52	BU508A	1.29	BZX619V1	0.09	MJF18204	6.07	TA8718N	7.69	TDA4601D	1.46
1N5408	0.09	2SC369	0.06	BA158	0.07	BC848B	0.35	BU508AF	1.32	BZX61C22V	0.11	MN650	1.71	TA8739P	6.01	TDA4605	4.10
1N6263	0.20	2SC3807	0.91	BA159	0.11	BC848C	0.41	BU508APH	1.99	BZX7910	0.30	MPSA06	0.35	TAA550B	0.31	TDA46052	1.97
1N914	0.02	2SC3953	0.72	BA3910B	6.99	BC856B	0.21	BU508D	1.56	BZX7912	0.11	MPSA13	0.18	TBA120S	0.89	TDA4950	1.76
1S44	0.11	2SC4517A	3.14	BA5406	2.14	BC858C	0.19	BU508DF	1.88	BZX7936	0.10	MPSA63	0.18	TBA120U	0.47	TDA7240A	2.57
2N2222A	0.23	2SC458	0.18	BA5412	2.48	BC875	0.33	BU508V	2.40	BZX793V9	0.09	MPSA93	0.11	TBA820M	0.35	TDA8138	3.59
2N3055	0.50	2SC4742	5.11	BA6209	1.18	BD131	0.26	BU536	1.65	BZX795V6	0.09	MR856	0.11	TDA1013A	1.56	TDA8140	4.62
2N3055H	1.29	2SC4769	4.02	BA6209N	1.27	BD132	0.26	BU806	1.03	BZX796V2	0.08	NE555	1.03	TDA1015	1.37	TDA8145	1.97
2N3773	1.52	2SC536	0.30	BA6219B	1.76	BD137	0.46	BU908	1.68	BZX79C33	0.11	NE555N	0.43	TDA1035T	4.27	TDA8170	4.70
2N3904	0.32	2SC945	0.11	BA6222	1.70	BD139	0.31	BUH515D	2.14	BZX79C5V1	0.11	P600A	0.33	TDA1044	1.43	TDA8172	2.65
2N4401	0.11	2SD1207	0.57	BA6247	1.95	BD140	0.24	BUK444500B	2.40	BZX853V9	0.11	P6KE130A	2.55	TDA1060	1.08	TDA8175	6.41
2N555	0.12	2SD1246	0.30	BAT43	0.52	BD233	0.23	BUL54AR	1.27	BZY8812	0.09	P6KE180A	4.65	TDA1085C	2.74	TDA8178FS	5.95
2SA1013	0.35	2SD1275	1.41	BAT85	0.96	BD234	0.36	BUT11	0.65	BZY882V7	0.23	PIC16C8404SO	4.50	TDA1170	1.82	TDA8180	4.87
2SA1015	0.11	2SD1276	1.39	BAV21	0.21	BD237	0.31	BUT11A	0.95	BZY883V0	0.11	R2KL	0.77	TDA1170N	2.57	TDA8190	3.59
2SA1020	0.44	2SD1292	0.64	BAX14	0.17	BD238	0.24	BUT11AF	1.18	BZY884V7	0.09	R2M	0.84	TDA1170S	2.05	TDA8350Q	5.56
2SA1029	0.26	2SD1330	0.31	BC107B	0.20	BD243	0.45	BUT12A	1.17	BZY885V1	0.13	R4050	3.04	TDA1180P	2.48	TDA8380	2.53
2SA1048	0.19	2SD1397	2.31	BC108	0.24	BD243A	0.60	BUT12AF	1.87	BZY88C12V	0.09	REGBABY10	13.00	TDA1516Q	3.59	TDA9503	2.13
2SA1145	0.36	2SD1398	2.14	BC109A	0.00	BD243C	0.44	BUT18AF	1.37	CD4001	0.24	RG2	0.64	TDA1518Q	4.27	TEA1039	2.11
2SA1286	0.60	2SD1426	3.51	BC141	0.36	BD244A	0.34	BUT56A	1.19	CD4017	0.47	RGP10G	0.26	TDA1519A	2.74	TEA2018A	2.29
2SA1370	0.43	2SD1427	2.91	BC147A	0.24	BD244C	0.43	BUV48A	1.97	CD4049	0.35	RGP15G	0.33	TDA1520B	4.50	TEA2029C	7.04
2SA1706	0.50	2SD1432	5.04	BC148A	0.35	BD245C	0.94	BUW11A	1.32	CD4052	0.29	RGP15J	0.17	TDA1524A	7.52	TEA2031A	4.26
2SA733	0.18	2SD1439	5.86	BC148B	0.11	BD433	0.29	BUW41B	1.39	CD4053	0.61	RGP15M	0.44	TDA1553Q	4.79	TEA2164	3.40
2SA872A	6.10	2SD1441	5.98	BC158B	0.12	BD434	0.31	BUW84	1.03	CNX62A	1.29	RGP30M	0.30	TDA1554Q	8.12	TEA2260	2.48
2SA933	0.36	2SD1453	3.85	BC168	0.04	BD436	0.52	BUX84	1.03	CNX82A	2.10	S2000A	2.57	TDA1557Q	4.23	TEA2261	3.68
2SA940	0.82	2SD1497	4.74	BC182	0.14	BD437	0.52	BUZ71A	1.03	CNX83A	2.55	S2000A3	3.59	TDA1558Q	7.69	TEA5101A	6.48
2SA950	0.18	2SD1541	4.96	BC182L	0.14	BD438	0.38	BUZ80	3.52	CNY75B	0.52	S2000AF	1.46	TDA1670A	2.98	TIC106D	0.82
2SA966	0.41	2SD1548	5.95	BC184A	0.12	BD681	0.47	BUZ80A	4.15	DTA114ES	0.31	S2055AF	3.74	TDA1675A	3.85	TIC246D	1.54
2SA992	0.31	2SD1554	3.25	BC184L	0.06	BD826	0.43	BUZ90A	3.40	DTC124ES	0.77	SAA129302	10.37	TDA1904	1.63	TICP106D	0.60
2SB1010	0.35	2SD1555	2.65	BC187	0.47	BD839	0.57	BUZ90AF	3.30	DTC144ES	0.19	SAB3035	1.71	TDA1908A	5.61	TIP110	0.35
2SB1066	0.82	2SD1556	5.11	BC212	0.09	BD901	0.52	BY127	0.18	FR605	1.90	SG264A	12.88	TDA2002	1.12	TIP112H	0.77
2SB1143	0.77	2SD1651	2.38	BC212B	0.19	BD902	0.60	BY133	0.08	FXT749	0.43	SGSIF344	10.70	TDA2005	1.83	TIP120	0.40
2SB1243	0.60	2SD1858	0.43	BC212L	0.18	BD911	0.52	BY206	0.20	HA13001	3.85	SL1430	1.92	TDA2006	1.06	TIP122	0.40
2SB560	0.43	2SD1877	2.14	BC237	0.12	BDT64C	1.18	BY227	0.13	HA13119	2.05	SL1431	2.82	TDA2030H	0.91	TIP2955	0.89
2SB643	0.29	2SD1878	2.63	BC237B	0.19	BDT65C	1.68	BY228	0.26	HA13151	13.20	SN74141N	0.17	TDA2030V	1.46	TIP29E	0.77
2SB647	0.57	2SD1879	3.16	BC238	0.11	BF194	0.22	BY2291000	1.31	HA51338SP3	7.69	STK4132II	10.00	TDA2050	4.56	TIP3055	1.08
2SB649A	0.77	2SD1884	3.35	BC238B	0.16	BF195	0.07	BY255	0.14	HM6251	14.32	STK4141II	10.23	TDA2270	12.08	TIP31A	0.36
2SB688	1.61	2SD1887	3.56	BC307	0.06	BF197	0.18	BY299	0.18	ICH28I	0.26	STK4142II	9.40	TDA2540	1.29	TIP32C	0.40
2SB698	0.35	2SD288	0.85	BC307B	0.15	BF199	0.18	BY397	0.20	IR9594	15.79	STK4152II	10.95	TDA2541	1.12	TIP35C	1.82
2SB716	0.43	2SD350A	1.97	BC308	0.09	BF258	0.04	BY398	0.16	IRFBC40	5.98	STK4192II	14.64	TDA2577A	3.45	TIP41C	0.65
2SB772	0.50	2SD381	1.66	BC308A	0.09	BF420	0.21	BY399	0.12	KIA6210AH	6.15	STK5332	2.82	TDA2578A	3.20	TIP42C	0.52
2SB774	1.61	2SD400	0.34	BC308C	0.26	BF421	0.24	BY448	0.30	LA4270	2.73	STK5342	4.07	TDA2579A	4.91	TIPL761A	1.85
2SB891	0.60	2SD401A	0.77	BC309B	0.10	BF422	0.19	BYD14J	0.35	LA4280	3.12	STK5372H	6.84	TDA2581Q	2.57	TIPL791A	1.25
2SB892	0.35	2SD468	0.28	BC327	0.10	BF423	0.14	BYD33D	0.12	LA4282	5.11	STK5421	9.52	TDA2582	3.85	TL072CP	1.03
2SC1008	0.24	2SD667	0.38	BC328	0.14	BF459	0.43	BYD33J	0.16	LA4445	3.45	STK5481	8.12	TDA2593	1.12	TMP47C432AP8189	
2SC124	0.48	2SD669A	0.64	BC337	0.14	BF471	0.37	BYD33M	0.26	LA4460	2.50	STK7253	7.69	TDA2600	7.69		15.19
2SC1318	0.19	2SD718	1.90	BC338	0.06	BF487	0.57	BYV10-40	2.55	LA4700	4.27	STK7308	6.41	TDA2611A	0.64	TMP47C434N3537	
2SC1473	0.21	2SD756	0.47	BC368	0.18	BF491	0.41	BYV95B	0.21	LA6324	2.05	STK7348	5.74	TDA2611AQ	1.32		15.22
2SC1573	0.52	2SD837B	1.12	BC369	0.18	BF494	0.12	BYV95C	0.28	LA6510	2.94	STR11006	7.37	TDA2653A	4.70	TMP47C434N3555	
2SC1675	0.14	2SD856	0.79	BC372	0.53	BF759	0.38	BYV96D	0.27	LA7830	1.88	STR4211	9.40	TDA3190	2.05		16.63
2SC1685	0.21	2SD882	0.43	BC546A	0.11	BF869	0.38	BYV96E	0.53	LA7832	2.40	STR50020	9.38	TDA3330	14.21	TPU2732	10.05
2SC1740	0.16	2SD898B	6.41	BC546B	0.12	BF871	0.41	BYW56	0.31	LA7835	2.99	STR50103	4.48	TDA3505	2.40	U2829B	3.40
2SC1815Y	0.11	2SD965	0.67	BC547	0.11	BF959	0.18	BYW95C	0.21	LA7837	4.19	STR50103A	5.56	TDA3560	6.13	UC3842	1.46
2SC2001	0.23	2SD965R	1.05	BC547A	0.04	BF960	0.30	BYW96E	0.50	LC7132	4.70	STR54041	5.15	TDA3561A	3.85	UC3844	1.20
2SC2023	3.18	2SK1117	3.40	BC547B	0.11	BF970	0.43	BYX55600	0.23	LED3G	0.10	STR5412	4.02	TDA3562A	4.62	UC3844N	1.91
2SC2073	1.03	2SK1118	3.40	BC548	0.11	BFR90A	0.68	BZV10	1.34	LED3R	0.10	STR58041	3.42	TDA3565	2.74	UPC1318AV	3.85
2SC2078	1.00	2SK30A	0.35	BC548A	0.11	BFY51	0.39	BZV85C5V1	0.15	LED3Y	0.10	STR59041	8.11	TDA3566	6.41	UPC1365C	1.70
2SC2120	0.23	7407	0.69	BC548B	0.06	BR100	0.18	BZX6110	0.16	LM317T	1.29	STR6020	6.07	TDA3576B	10.31	UPC1378H	1.71
2SC2229	0.31	74HC04	0.88	BC548C	0.14	BR103	0.62	BZX6111	0.10	LM324N	1.48	STRD1816	7.69	TDA3592A	4.60	UPC1394C	1.92
2SC2230	0.55	7805	0.78	BC549B	0.11	BRX44	1.02	BZX6112	0.13	LM339N	0.50	STRD4420	10.64	TDA3640	5.98	UPC1488H	2.99
2SC2235	0.36	7806	0.60	BC550B	0.16	BRX49	0.43	BZX61120	0.28	M494B1	11.85	T9053V	1.35	TDA3650	11.04	UPC1498H	2.31
2SC2236	0.36	7809	0.69	BC550C	0.09	BRY55	0.28	BZX6113	0.11	M5218L	0.69	T9064V	1.87	TDA3653B	1.54	UPC574J	0.86
2SC2240	0.21	7812	0.52	BC556A	0.11	BSX20	0.35	BZX6116	0.19	M54544L	2.04	TA7120P	0.66	TDA3653C	2.82	X2402P	5.78
2SC2271	0.67	78L05	0.35	BC556B	0.14	BT139600	1.29	BZX6120	0.19	M58655P	4.96	TA7280P	2.74	TDA3653CQ	2.57	ZTK33B	0.28
														TDA3654	1.44	ZTX650	0.51

IF YOU DONT SEE IT LISTED ASK FOR QUOTE. GIVE MAKE, MODEL, LOCATION. REMEMBER TO ADD £1.00 POST & HANDLING U.K. MAINLAND ONLY. EXPORT AT COST. ADD 17.5% VAT TO TOTAL

WILTSGROVE LTD

28/29 RIVER STREET, DIGBETH, BIRMINGHAM B5 5SA
TEL:0121-772-2733 FAX:0121-766-6100

BRANCH: **VISIONCARE**

21 DEACON WAY, SCOURS LANE, TILEHURST READING BERKS
TEL: 01734 420251 FAX: 01734 420555

STRICTLY TRADE ONLY !!

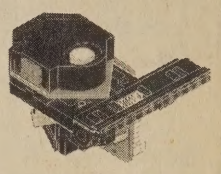
CD LASER PICK-UP

SPARES ONLY AVAILABLE AT WILTSGROVE LTD

AP-1002	KSS210A, KSS212, KSS150A, 884806201.	£14.95	AP-1027	OPTIMA 6S.	£52.85
AP-1003	KSS151A, 884824601.	£34.39	AP-1028	OPTIMA 5S.	£36.86
AP-1004	KSS152A, TAOHS-MR, TOPH7833.	£19.95	AP-1030	KSS123A, KSS121A, X4910441.	£35.36
AP-1005	KSS240A, MHC1100.	£27.00	AP-1035	KSS212B.	£15.95
AP-1006	KSS225.	£44.95	AP-1045	KSS220A.	£18.95
AP-1007	614-239-1303, SFPIPS.	£26.85	AP-1050	KSS363A.	£18.95
AP-1008	RCTRH8124AFZZ.	£19.85	AP-1055	KSS541A.	£19.89
AP-1009	RCTRH8130AFZZ.	£19.85	AP-1060	KSS542A.	£19.65
AP-1012	KSS210B, KSS240B, KSS150B.	£15.75	AP-1065	KSS543A.	£19.56
AP-1013	PEA1030.	£49.75	AP-1070	KSS580A.	£22.75
AP-1014	PEA1009, PNW185.	£46.89	AP-1075	KSS162A.	£18.95
AP-1016	482269120931	£47.85	AP-1080	MLP3.	£19.95
AP-1017	KSS213B.	£16.75	AP-1085	MLP7.	£19.95
AP-1018	CDM12.1.	£17.25	AP-1090	SF88.	£20.65
AP-1019	CDM12.4.	£17.99	AP-1095	SPU-1.	£18.75
AP-1026	KSS480A.	£22.85			

SPARES ONLY AVAILABLE AT WILTSGROVE LTD

UNBEATABLE OFFER !!



CAMCORDERS
(GRADED STOCK)
NOW IN STOCK !!

VPH-65
12X ZOOM, 8mm HI-BAND
6 MODE PROGRAM AE
R.R.P ~~£699~~ OUR PRICE **£269**

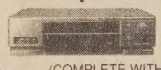
QUANTITY DISCOUNT AND A WIDE RANGE OF MODELS AVAILABLE

GRADED STOCK
WORKING
REMOTE CONTROL TELEVISION
£69.95

ALL WORKING STOCK IN ORIGINAL BOX & COMPLETE WITH ACCESSORIES

UNBEATABLE OFFER !!

Television & Video
JAPANESE BRAND
PACKAGE DEAL



✓ 25" FST NICAM TV
+
✓ NICAM VCR, LP/SP, VIDEOPLUS

ONLY **£395**

(COMPLETE WITH HANDSET, INSTRUCTION BOOK & IN ORIGINAL BOX)

FAX MACHINES
NOW IN STOCK

AMSTRAD TFX500
12 MONTH GUARANTEE **£119**

FREE DELIVERY
ON
REASONABLE ORDERS, TO MOST AREAS IN U.K

YOUR MAIN SUPPLIER FOR GRADED AND EX-RENTAL TV'S + VIDEO'S + MIDI SYSTEMS. UNTESTED STOCK AVAILABLE. CALL NOW FOR UNBEATABLE OFFERS. ***EXPORT INQUIRES WELCOME***

EX-RENTAL
10 MIXED TX100
5 x R/CONTROL
5 x TEXT
£400

NEW

BRAND NEW EUROPEAN STOCK
28" NICAM MAHOGANY COLOUR
£375
12 MONTH GUARANTEE
28" (16.9) WIDESCREEN NICAM
£449
12 MONTH GUARANTEE
(COMPLETE WITH HAND SET, INSTRUCTION BOOK & IN ORIGINAL BOX)

EX-HOTEL STOCK
TELEVISION
21" FST/R-C STEREO CTV
WITH UHF/VHF TUNER
£75

EX-RENTAL VCR'S
ALL WORKING STOCK, WITH HAND SETS
5 MIXED SLIM VCR'S **£225**
10 MIXED VCR'S **£375**

GRADED STOCK

5 MIXED VCR'S
3 x L/P, S/P VIDEOPLUS
2 x L/P, S/P VIDEOPLUS NICAM
£599
(COMPLETE WITH HAND SET, INSTRUCTION BOOK & IN ORIGINAL BOX)

GENUINE UNTESTED CTV
BASIC T.V FROM £12.00
R/CONTROL FROM £16.00
TEXT FROM £20.00

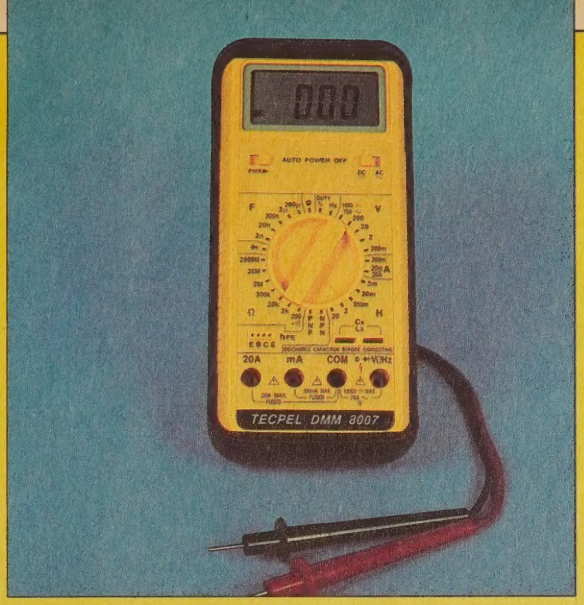
GENUINE UNTESTED VCR
VCR FRONT LOADERS R/CONTROL
£25

EX-RENTAL TV'S
20 MIXED TELEVISIONS
5 TEXT + 6 R/C + 5 BASICS + 4 PORTABLES **£530**
(ALL WORKING STOCK, WITH R/CONTROL)

EX-RENTAL STOCK AVAILABLE DIRECT FROM SOURCE
ALSO AVAILABLE BRAND NEW STOCK WITH 12 MONTHS GUARANTEE PLEASE CALL FOR FURTHER INFORMATION

ALL STOCK SUBJECT TO AVAILABILITY, CARRIAGE & V.A.T

FREEFAX ORDERLINE: 0500 55 05 05



Versatile dmm with *L, C* and *f* ranges for £69 – fully inclusive

Specifications

Voltage		
DC volts	200mV, 2V, 20V, 200V, 1000V	±(0.5%rdg+1dig)
AC volts	200mV, 2V, 20V, 200V	±(1.2%rdg+3dig)
	750V	±(2%rdg+3dig)
Resolutions	100µV, 1mV, 10mV, 100mV, 1V	
AC range	50 to 500Hz	
I/p protection	1000V dc or 750V rms	
I/p impedance	10MΩ	
Current		
DC	20mA, 200mA	±(1%rdg+1dig)
	20A	±(3%rdg+3dig)
AC	20mA, 200mA	±(1.5%rdg+4dig)
	20A	±(3.5%rdg+4dig)
Resolutions	10µA, 100µA, 10mA	
AC range	50 to 500Hz	
Overload	Fast-blow fuse	
Resistance		
Ranges	200Ω	±(1%rdg+4dig)
	2kΩ, 20kΩ,200kΩ, 2MΩ	±(0.8%rdg+2dig)
	20MΩ	±(2%rdg+5dig)
	2000MΩ	±(5%rdg+10dig)
Resolutions	0.1Ω, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ, 1000kΩ	
Overload prot.	500V dc or rms ac	
Capacitance		
Ranges	2nF, 20nF, 200nF, 2µF, 200µF	±(5%rdg+10dig)
Resolutions	1pF, 10pF, 100pF, 1nF, 100nF	
Inductance		
Ranges	2mH, 20mH, 200mH, 2H, 20H	±(5%rdg+10dig)
Resolutions	1µH, 10µH, 100µH, 1mH, 10mH	
Frequency		
Range	2kHz-20MHz (20Hz-20MHz)	±(0.5%rdg+3dig)
Selection	Autoranging	
Transistor test		
Range, h_{FE}	0-1000	
Base current	10mA	
V_{CE}	3V	
Diode test		
Current	1mA	
V_{test}	3V	
Overload	500V dc	
Logic test		
High threshold	2.8V	
Low threshold	0.8V	
Duty cycle	>20%, <80%	
Pulse width	25ns min.	
Overload	500V dc or rms	
Physical		
Power	Standard 9V battery	
Accessories	9V battery, test leads, manual, holster	

20% reader discount

DMM8007 is a versatile hand-held meter featuring measurement ranges for:

- Frequency to 20MHz
- Inductance 20H
- Capacitance to 200µF
- DC and AC current to 20A
- Resistance to 2000MΩ
- Transistor gain

These ranges are in addition to the usual digital multimeter measurement ranges. This 31/2-digit meter also has a logic test facility for checking digital signal level plus audible continuity test. Supplied in a rubber holster, the DMM8007 is a heavy duty design – drop-proof to 10 feet – and has a full twelve month guarantee. Overload protection is built in too.

This meter normally retails at £88.13, but Vann Draper is making the instrument available exclusively to *Television* readers filling in the coupon below at the special discount price of just £69 fully inclusive of VAT and UK postage (overseas readers please contact Vann Draper for details). Vann Draper can be reached on 0116 2771400, or by fax on 0116 277 3945.

Use this coupon to order your DMM8007

Please send me.....DMM8007(s) hand-held meter at the fully inclusive special offer price of £69 each.

Name

Company (if any)

Address

Phone number/fax

Total amount £.....

Make cheques payable to Vann Draper Electronics Ltd
Or, please debit my Master, Visa or Access card.

Card No
Expiry date

Please mail this coupon to Vann Draper Electronics, together with payment. Alternatively fax credit card details with order on 0116 2773945 or telephone 0116 2771400. Address orders and all correspondence relating to this order to Vann Draper Electronics at Unit 5, Premier Works, Canal Street, South Wigston, Leicester, LE18 2PL. Overseas readers can also obtain this discount but details vary according to country. Please ring, write or fax to Vann Draper Electronics

TELETOPICS

End of Recommended Retail Prices

The government is to implement the Monopolies and Mergers Commission's proposal that manufacturers'recommended retail prices on a wide range of electrical goods should be banned. Goods affected include TV sets, VCRs, camcorders, hi-fi equipment, washing machines, driers, dishwashers and refrigerators. Discrimination by manufacturers against warehouse clubs that sell discounted goods to their members is also to be ended (it was a complaint by Cargo Club that led to the MMC's enquiry being set up in 1995). The MMC's report was published on July 30th, and there is to be an eleven-week consultation period.

Independent retailers are likely to be hardest hit by the new rules, which could encourage supermarkets and other non-specialist retailers to enter the brown and white goods markets. The two leading specialist retailers, Dixons with 19 per cent of the market and Comet with 10 per cent, have both stated that the changes will have no effect on their selling prices. In view of the slim margins in the trade, it's unlikely that consumers will benefit much. Retailers will seek lower prices from manufacturers, who are already operating with low margins – one per cent after costs but before tax according to Panasonic. Retailers such as Comet are understood to operate with net returns of about three per cent. If retailers cannot make a worthwhile profit, the outcome could be fewer outlets with reduced competition and higher prices.

JVC has just launched two new digital camcorders, Models GR-DVX and GR-DVX2 (see photograph). Both incorporate a high-resolution LCD colour monitor. The GR-DVX, which is expected to sell at around £1,600, has an analogue docking system for simple, quick signal transfer to a VCR. The GR-DVX2 has PC compatibility that provides editing and viewing without the need to purchase any additional software. This version is expected to sell at around £1,800.

Digital Television

The BBC is to invest some £1bn over the next five years on going digital. About nine per cent a year on average of licence fee revenue will be devoted to new equipment and launching new free and subscriber channels. A 24-hour news service and more widescreen programming are planned. These moves will probably represent the biggest changes in the BBC's history. The Corporation will aim to cut twenty per cent from its current expenditure during the period – according to the BBC's director general John Birt "more programmes will be made by fewer staff". The BBC says consultations with viewers suggest that 77 per cent approve of its plans for digital TV.

The Digital Video Broadcasting (DVB) Project has issued the DVB Blue Book Implementation Guidelines for the use of MPEG-2 Systems, Video and Audio in Satellite, Cable and Terrestrial Broadcasting applications. The specification includes provision for Standard Definition (SDTV) and High Definition TV (HDTV) for both 50 and 60Hz countries.

NetProducts has launched the first European Internet access device that links up with a TV set. The NetStation can be used with PAL or NTSC receivers, connection being made via a scart link or phono sockets. Cost is about £300.

Pace Micro Technology has added an Impulse Pay-per-View feature to its DVC200 digital cable receiver. This feature gives subscribers the opportunity to pay for programmes as they are being broadcast rather than booking in advance for pre-scheduled events. A contract to supply a further 22,000 cable receivers to the Italian multimedia provider Stream has been awarded to Pace. The company has also received a "substantial increase" in orders from Canal+ to provide digital satellite decoders for the French market – the receivers will use SECA's Mediaguard conditional access system.

United News and Media and NTL, the companies behind Digital Television Network (DTN) which lost out to British Digital Broadcasting for the UK's main digital terrestrial licences, are to take a 49 per cent stake in SDN (S4C Digital Networks). SDN has been awarded DTT multiplex A.

One-use DVDs

A cheap, throw-away video disc system, called Zoom TV, is being considered by Hollywood studios. The digital video discs would be encoded to allow only a single viewing and would cost around $5. Discs could however be reactivated, for a further recording, via a modified player connected by telephone line to the film's maker, distributor or an agent.

Business News

Botts and Co., a small London-based merchant bank formed ten years ago, is to be the eventual owner of Grundig. It has bought a 26·6 per cent stake from Philips and a 16·4 per cent stake from the German asset manager Hohenstaufen, and has agreed to buy the 52 per cent stake currently held by the Max Grundig Foundation when this is due to be bought by Philips in 2004. Philips will retain a 5 per cent interest.

Botts has no immediate plans for restructuring Grundig, which it feels "can be resurrected". Philips will be relieved to have largely extricated itself from the loss-making Grundig. Relations between the two companies have become increasingly bitter in recent times. In view of Grundig's losses, Botts could end up paying little for its investment. How it could make anything of Grundig remains to be seen.

Pace Micro Technology increased turnover by twelve per cent in the year to May 31st 1997. Profit before tax was slightly higher at £18·4m (£18·2m). The company has been going through a difficult period in recent months. Analogue satellite receiver sales have declined, while digital equipment sales failed to meet expectations. The company has invested in the digital side, but delays in the start of services have held back growth in this area.

China's largest TV set manufacturer, Sichuan Changhong, intends to start selling receivers in the USA in 1999 and to open an overseas production plant. The company is to acquire two domestic rivals this year, increasing its share of the Chinese TV receiver market to 33 per cent.

Multimedia Training

Multimedia Training U.K. has been formed as a new company to handle the training needs of the consumer electronics industry in the coming age of digital broadcasting. Its three partners have over 75 years' experience in the industry, ranging from hands-on servicing to in-depth technical training. The company will undertake technical and product knowledge training for manufacturers, large retail companies, groups of independent retailers and any organisation that has training needs in the consumer electronics field. Services offered include engineer technical training, product knowledge for sales staff, representation or support at exhibitions etc. and general technical liaison. For further information contact the London office at 0181 661 7590, the Midlands office at 01623 490 200 or the Scottish office at 01314 452 761.

EC Proscribes Piracy

The European Commission has issued a proposed Directive that would outlaw devices designed to avoid payment for TV, radio and on-line services. It would require member states to prohibit smart cards, decoders and software that provide unauthorised access to services such as pay-TV, video-on-demand and electronic publishing offered subject to payment. The manufacture, import, sale, advertising, possession, installation, maintenance or replacement of illicit items would become illegal, with member states having to provide effective sanctions.

DASA is in Business

The Domestic Appliance Service Association (DASA) has enrolled its first consumer electronics manufacturers and independent service organisations as members. DASA will now be extending its network of independent service organisations that manufacturers can support and trust. The Association and its related company EESEL, which is concerned with helping engineers to achieve NVQs, have moved to new offices. For further information and an application form contact Chris Hayter (Director), DASA, 71 The Maltings, Stanstead Abbotts, Hertfordshire SG12 8HG (01920 872 464, fax 01290 872 498).

First D-VHS Recorder

The first Data-VHS (D-VHS) recorder, Model HM-DSR100, is to be launched by JVC in the USA this October. It has been developed with digital satellite operator Echostar, and includes a built-in decoder for Echostar transmissions. A bit-stream recording system is used to store the data on VHS tape. The data can then be fed back to the digital decoder for decoding and display.

The D-VHS standard has a record data rate of 14·1Mbits/sec. Up to seven hours of video can be stored on a single cassette. This is equivalent to 44·4Gbytes of data.

Other features include an eight-head system (a DA four-head system for VHS video, two FM audio heads and two D-VHS heads), a V-chip to enable parents to control what their children watch, a Dolby AC3 output socket and a programme-browse system that enables the user to channel surf while watching a current programme. The first D-VHS machines are expected to arrive in Europe next year. The price in the USA is likely to be the equivalent of around £700.

Hameg has introduced a new analogue/digital oscilloscope, Model HM1507 (see photograph), a new version of the HO500 computer interface, and the HM8133-2 1GHz signal synthesiser.

At £1,355 + VAT the HM1507 sets an outstanding price/performance standard in analogue and storage operation. It includes the Hameg component tester and has a second timebase that can be triggered after the delay time, providing alternate and delay timebase facilities in both the analogue and storage modes. The 150MHz bandwidth is complemented by a 200MS/sec sampling rate in the store mode – with four 2K x 8 bit memories. Up to ten front panel set-ups can be saved and recalled using the ten internal memories, or any number using a PC (via the RS232 socket). Two-way data transfer is also possible via the RS232, so that the PC can log and print waveforms.

The new version of the HO500 computer interface is for use with the Hameg range of low-cost spectrum analysers. There are four models in the series: a spectrum analyser; an analyser/tracker up to 500MHz; and two similar units up to 1GHz. The interface card is supplied inside the analyser, and is connected directly to a PC RS232 serial port. Any of the four HM5000 series spectrum analyser/tracker generators can be delivered with the HO500 installed.

The HM8133-2 signal synthesiser provides continuous coverage from 1Hz to 1GHz with a resolution of 0·1Hz and an accuracy of better than 4 x 10^{-7}. Two frequencies (400Hz and 1kHz) are available for internal or external amplitude or frequency modulation.

For further details apply to Hameg Instruments Ltd., 70-78 Collingdon Street, Luton, Bedfordshire LU1 1RX (01582 413

Camcorner

Reports from
David C. Woodnott

Sony CCDF500E

The reported symptom was no operation. We found that the cassette housing would open and close without a tape, but wouldn't close with a tape inserted. The reason for this was the fact that the drum did not rotate. It would twitch, but failed to operate correctly. We replaced five leaky electrolytic capacitors in the drum commutation circuitry. This restored normal operation. **D.C.W.**

Hitachi VM600E

This full-size VHS oldie behaved erratically. It would sometimes operate reasonably well, and at other times not. With this model we generally replace the pinch roller assembly, the mode encoder switch assembly and fit a new set of belts (three). You have to replace the complete pinch roller assembly, with operating arm – replacing the pinch roller only is often ineffective, as the riveted pivot comes loose. It's also worth checking the CAM/VTR switch, which can give trouble.

These measures plus a service will usually restore the unit to good health. **D.C.W.**

Sharp VLC790H

One of these units arrived with the cassette housing open and the mechanism in the eject mode. It would power up, and the E-E pictures were OK. We began by checking the mechanism alignment, which proved to be correct. We then set the mechanism to the stop mode manually and powered up. The cassette housing instantly opened and refused to close!

We now realised that this wasn't going to be as simple as we had at first thought. So we decided to check the syscon and mode motor circuits, and found that the A/D 5V supply to the mode control circuitry was missing. C802 (22µF, 16V) had leaked and corroded the print, thereby rendering the supply open-circuit between D804, pin 2, and Q810 (switch).

We replaced C802 then cleaned the damaged print and fitted a link across it. This time the cassette housing behaved as it should when the unit was powered up. **D.C.W.**

Sanyo VMD5P

This uncommon model (to us, anyway!) had an E-E picture with striations and a low luminance signal level. Playback was similarly affected. The cause was (surprise, surprise!) a number of leaky capacitors on the main PCB. In all we had to replace 23 – after the usual washing session etc. with the PCB. This restored the unit to full working order.

The VMD5P seems to have been based on the earlier Model VMD3P, about which we've written before regarding its capacitor problems. **D.C.W.**

Canon E6E

This is a hybrid model – part Sony (TR55 mechanism and main PCB). It was brought in because of a sound problem: the recorded sound would disappear and reappear at will, making life a little tiring for the owner (and me!).

There are two audio PCBs in this model. The fault was on audio PCB 2. After replacing C1215, C1216, C1219, C1223 and C1224 the unit provided a consistent audio level. **D.C.W.**

Sony CCDF340E

We had to chuckle over this one. It arrived with striations on the E-E and playback pictures – the AV and EVF pictures were both affected. As usual, the cause was leaky capacitors. After replacing C494, C497 and C499 on the main PCB (VA41) we had clear pictures at the AV connector, but the EVF picture was still covered with striations. The cause this time was C909 on the EVF PCB (good job we checked the viewfinder!). **D.C.W.**

Sanyo VMD9P

No power up the report said. It's an unusual situation with this model – except for broken battery contacts! The cause was simply the 3A ceramic fuse F3001, which was open-circuit. We could find no cause for its failure. **D.C.W.**

Panasonic NVMC6B

This VHS-C model wouldn't power up. We found that the fusible link (R1037) on the main PCB was open-circuit because zener diode D1003 was short-circuit. Replacing these two items restored normal operation.

To avoid further problems later we usually replace the mode encoder switch when servicing these machines. **D.C.W.**

Sharp VLC690H

An E-E picture with striations is commonly caused by the failure of C210 (33µF, 16V) on the YC PCB. We recommend that all the electrolytics are inspected for leakage, as age is now taking its toll with these camcorders. **D.C.W.**

Sanyo VMEX220P

Playback was OK, but there was no E-E picture: only vertical lines were visible at both the AV connector and the EVF in the E-E mode. It's not uncommon to experience connection problems between the CCD and the camera main (CA-2) PCBs when one of these popular machines has been dropped – the connector on panel CA-2 can become detached from the print. We checked on this first, and found that the connections were intact.

Checks around the CCD drive chip (SSG) then showed that two of the V drives were missing. The CXD1257AR timing chip IC916 was faulty, all other outputs being OK. A replacement chip restored the E-E picture, and a service completed the repair. **D.C.W.**

BA157=0.10	LA7850=2.25	STK5337=4.85	TDA1013A=2.99	2N6539=0.35	2SD810=0.55
BYD33D=0.15	LB1645=2.00	STK5488=4.75	TDA1060=3.25	2SA747=4.95	2SD836=0.75
BYD33M=25	LM384=1.25	STK6962=2.50	TDA1082=2.75	2SA794=0.60	2SD838K=POA
BYW95C=28	M293B1=15.00	STK7217=5.25	TDA1175=2.10	2SA861=0.70	2SD1047=2.25
BYX10=15	M710B1=6.10	STK7308=3.50	TDA1235=3.40	2SA893=0.50	2SD1271=0.75
BYX98=3.25	M51365=3.99	STK7404=6.40	TDA1517=2.50	2SA949=0.80	2SD1308=0.90
OA91=0.12	M54519=4.99	STK8250=5.00	TDA155Q=4.50	2SA1006=1.18	2SD1403=2.85
RGP15K=30	M58658P=6.99	STK73410=2.85	TDA155Q=3.65	2SA1062=1.00	2SD1453=4.40
AN3320K=7.50	MC1377P=4.25	STK73410=3.50	TDA1670=2.50	2SA1124=0.78	2SD1497=2.50
AN5071=2.29	MDA2060=3.50	STR450=16.50	TDA1904=0.80	2SA1180=2.25	2SD1651=1.80
AN5138=4.30	MDA2061=7.99	STR441=8.50	TDA2004=1.90	2SA1302=3.00	2SD1889=3.15
AN5265=0.95	NE544N=4.50	STR451=19.50	TDA2148=3.25	2SB524=0.65	2SD2125=4.15
AN5512=1.35	PA3029N=24.99	STR1195=7.99	TDA2541Q=3.10	2SB618=3.05	2SK193=030
AN5521=1.35	SAA1043P=6.50	STR4090=11.15	TDA2577=P.O.A.	2SB648=0.50	2SK176=8.00
AN5620=2.50	SAA1251=6.99	STR11006=3.50	TDA2578A=2.25	2SB817=2.25	AF200=0.80
AN5790=2.40	SAA1293-3=5.15	STR16006=3.99	TDA2653A=2.40	2SB883=1.40	BC303=0.20
AN6250=2.99	SAA3004P=3.15	STR30115=2.75	TDA3030B=5.50	2SB1156=0.79	BC877=0.50
AN6652=1.00	SAA3027P=5.05	STR30125=5.99	TDA3330=11.85	2SC372=0.30	BC880=0.40
AN6878=2.50	SAA5000=4.15	STR44115=5.99	TDA4503=3.00	2SC461=0.10	BD142=1.50
AN7110=1.00	SAA5230=12.50	STR50092=5.50	TDA6200=10.50	2SC536=0.20	BD226=0.30
AN7169=2.00	SAA7000=8.99	STR50103A=3.85	TDA8214B=3.45	2SC741=3.00	BD677=0.50
APU2400T=9.45	SAB3021=3.99	STR50115=4.50	TDA8372=7.25	2SC840=3.15	BD791=0.60
BA340=1.40	SAB3035P=5.45	STR50213=4.50	TDA8380=2.50	2SC901A=3.50	BDT64C=2.10
BA536=1.50	SAB3210=2.99	STR53041=4.50	TDA8405=8.00	2SC1123=0.45	BDT65C=2.10
BA3920L=2.50	SAJ210=3.15	STR54041=3.50	TDA8732=5.95	2SC1185=2.25	BDX670=1.67
BA5102A=1.10	SDA2516=3.00	STR56041=4.50	TEA2018A=1.50	2SC1317=0.15	BF337=0.30
BA5406=1.80	SDA3002=11.15	STR58041=3.00	TEA1039=1.75	2SC1675=1.85	BF479=0.30
BA6209=1.00	SDA5243=10.15	STR80145=5.50	TEA2031A=1.80	2SC1756=0.35	BF760=0.40
BA6247=2.00	SL1454=18.95	STRD1816=3.99	TEA2164=3.25	2SC1819=0.78	BF872=0.25
BA7766=2.80	STA451C=3.95	STRD6001=5.15	TEA2260=2.99	2SC1904=3.10	BFR96=1.00
CNX36=90	STK032=8.75	STRD6108=7.00	TEA5170=1.40	2SC2200=2.50	BFX89=2.50
CNX62A=9.75	STK0049=4.00	TA7119=1.30	TEA8172=1.99	2SC2271=0.55	BU502=1.25
CNX82A=0.80	STK0060=7.99	TA7210=8.95	TMS3741=5.50	2SC2440=3.00	BU508A=0.80
HA1350=2.00	STK435=3.50	TA7230=1.00	TPU2732=19.99	2SC2580=2.35	BU2525=4.10
HA1457=8.99	STK439=3.99	TA7245=2.00	U2829B=1.70	2SC2671=1.20	BUT13=2.25
HA11223=1.35	STK1040=6.35	TA7256=3.99	UAA1008=300	2SC2706=3.50	BUTD6A=1.05
HA11244=2.99	STK2029=4.75	TA7722=8.99	UAA4009=7.00	2SC2753=0.40	BUW41B=0.80
HA11713=1.00	STK2240=6.50	TA7280=1.90	UC3844=1.50	2SC2898=2.50	BUX80=1.80
HA11715=2.10	STK3042/2=4.75	TA7281=2.00	VCU2133=13.00	2SC3156=4.00	BUX98A=4.50
HA12411=5.75	STK3082=5.25	TA7302=2.25	VPU2203=12.50	2SC3178=2.25	MJ15024=6.50
HA17741=4.99	STK4017=3.85	TA7318=4.90	XR2207=4.85	2SC3212=3.50	MJ13009=2.00
IRF840=2.50	STK4042=7.99	TA7328=1.50	UPC1018=1.10	2SC3279=1.15	S2055AF=1.85
KIA6283=2.50	STK4112/2=9.25	TA7604=3.50	UPC1163=1.15	2SC3306=2.50	T906SN=9.99
L4964=4.99	STK4131/2=6.50	TA7680=2.00	UPC1185=6.00	2SC3358=0.60	T1P41C=0.35
LA3300=1.30	STK4141/2=5.50	TA7698=4.75	UPC1212=1.70	2SC3459=2.10	TIP42C=0.40
LA3350=1.99	STK4151/2=6.80	TA8200=3.50	UPC1278M=2.20	2SC3679=3.50	TIP40=0.85
LA4182=1.65	STK4161/2=5.15	TA8215=3.00	UPC1365C=2.50	2SC3795=2.00	TIP147=0.98
LA4422=1.25	STK4191/2=6.85	TA8221=5.75	UPC1536=5.25	2SC3973B=2.75	TIP2955=0.50
LA4446=2.90	STK4272=5.99	TA8618=1.80	15/80H=2.50	2SD200=1.80	TIP3055=0.50
LA4500=2.00	STK4352=4.85	TA8694=4.99	15/85H=2.50	2SD350=4.10	TIPL761=1.89
LA4700=4.40	STK4773=8.20	TBA520=0.95	BTA25=3.99	2SD371=2.99	TIP1763=3.85
LA7279=1.50	STK5315=4.75	TBA2800=2.50	24004=1.20	2SD551=6.99	7808=0.38
LA7830=1.99	STK5326=4.99	TCA2705=2.99	2N3055H=0.55	2SD621L=4.00	7809=0.38
LA7835=2.35	STK5335=3.25	TCA955=4.10	2N6130=0.40	2SD761=0.55	7818=0.38

FOR SPECIAL OFFER PRICES PLEASE RING OUR SALES HOT-LINE

Prices Down On:
Video-Heads Pinch - Rollers Remote - Controls Semi Conductors Etc Etc.

New - New
Lower Prices
Catalogue Out Soon

Please phone us for the types not listed.
Please add 60p post & packing and then add 17.5% to the total.
Callers by appointment only.

J.J. COMPONENTS
r/o 243-247 Edgware Road,
The Hyde, Colindale NW9
Tel: Sales Hotline 0181 205 9055
Fax: Admin 0181 205 2053
Free fax orderline only : 0800 318 498

WE HAVE THE WIDEST CHOICE OF USED OSCILLOSCOPES IN THE COUNTRY

PHILIPS PM3296A Dual Trace 400MHz Delay Cursors	£1750
PHILIPS PM3295 Dual Trace 350MHz Delay Cursors etc	£1500
H.P. 54200A Digitising Oscilloscope 50MHz	£750
TEKTRONIX 2445 4 Channel 150MHz Delay Cursors	£1500
TEKTRONIX TAS465 Dual Trace 100MHz Delay Cursors	£900
TEKTRONIX 475 Dual Trace 200MHz Delay Sweep	£500
TEKTRONIX 465 Dual Trace 100MHz Delay Sweep	£400
TEKTRONIX 2215 Dual Trace 60MHz Delay Sweep	£400
PHILIPS 3065 2+1 Channel 100MHz Dual TB/Delay	£700
PHILIPS 3055 2+1 Channel 50MHz Dual TB/Delay	£500
PHILIPS PM3217 Dual Trace 50MHz Delay Sweep	£400
GOULD OS1100S1 Dual Trace 30MHz	£200
GOULD OS300 Dual Trace 20MHz	£200
KIKUSUI 5530A Dual Trace 35MHz	£220
PHILIPS PM3206 Dual Trace 15MHz	£200
HITACHI V209 Dual Trace 20MHz Ma ns/Battery	£400
PHILIPS PM97 Dual Trace 50MHz Scopemeter Dig Storage	£700
TEKTRONIX Tekmeter THM565 True RMS MM/Autoranging	£500
LEADER LCD100 DMM/Scope 200KHz Digital Storage LCD	£300
TEKTRONIX TDS340 Digital Storage 100MHz 500 Mega Sampler	£1400
TEKTRONIX 2230 Digital Storage 100MHz Cursors	£900
TEKTRONIX 2210 Digital Storage 50MHz Cursors	£700
TEKTRONIX 468 Dual Trace 100MHz Dig Storage	£750
HITACHI VC6041 Dual Trace 40MHz Dig Storage	£600
BECKMAN 9302 Dual Trace 20MHz Dig Storage	£450
GOULD 1425 Dual Trace 20MHz Dig Storage Cursors etc	£400
TEKTRONIX 466 Dual Trace 100MHz Delay Analogue Storage	£450
H.P. 1741A Dual Trace 100MHz Analogue Storage	£400
TEKTRONIX 434 Dual Trace 25MHz Analogue Storage	£250

THIS IS JUST A SAMPLE – MANY OTHERS AVAILABLE

H.P. 8620C Sweep Osc with 86290B 2-18GHz	£1750
H.P. 8620C Sweep Osc with 86222B 0·01 / 2·4GHz	£1750
H.P. 8656A Synthesized Sig Gen 0·1-990MHz	£1900
MARCONI 2017FM/AM Signal Generator 10KHz-1024MHz	£1900
MARCONI 2019A Synthesized FM/AM Sig Gen 80KHz-1040MHz	£1800
MARCONI 2019 Synthesized FM/AM Sig Gen 80KHz-1040MHz	£1600
H.P. 8640B Phase Lock Syn Sig Gen 500KHz-512MHz	£750
H.P. 8640A FM/AM Sig Gen 500KHz-1024MHz	£650
FARNELL PSG520 Synthesized FM/AM Sig Gen 10MHz-520MHz	£450
FARNELL SSG520 Synthesized FM/AM Sig Gen 10-520MHz	£325
FARNELL TTS520 Transmitter Test Set	£350
MARCONI TF2361 Sweep Generator 1-300MHz	£200
H.P. 8616A UHF Signal Gen 1.8-4.5GHz	£250
H.P. 8614A UHF Signal Gen 800MHz-2.4Gz	£250

SPECTRUM ANALYSERS

H.P. 8565A 0·01-22GHz	£3500
AILTECH 727 0·001-7·0GHz	£2000
ANRITSU MS62B 10KHz-1.7GHz (Shight shadowing on storage)	£1200
H.P. 182 with 8558B 100KHz-1500MHz	from £1500
H.P. 141T with 8555A & 8552B 10MHz-18GHz	£1500
H.P. 141T with 8554B & 8552B 500KHz-1250MHz	£1200
H.P. 141T with 8553B & 8552A 1KHz-110MHz	£800
H.P. 140T with 8554L & 8552B 500KHz-1250MHz	£900
H.P. 141T with 8553L & 8552A 1KHz-110MHz	£700
H.P. 141S with 8553L & 8552A 1KHz-110MHz	£600
MARCONI TF2370 with TK2373 30Hz 1·25GHz	£1750
MARCONI TF2370 30Hz-110MHz	from £700
H.P. 3580A 5Hz-50KHz	£800
H.P. 3582A Dual Channel 25KHz	£2000
H.P. 8443A Tracking Generator/Counter	£500
H.P. 8444A Tracking Generator	£1000

MARCONI 2435 Frequency Meter 10Hz-2GHz	£400
MARCONI 2437 Universal Counter/Timer DC-100MHz	£175
MARCONI 2432A Frequency Counter 10Hz-560MHz	£225
MARCONI 2430A Frequency Counter 10Hz-80MHz	£125
RACAL 1998 Frequency Counter 1.3GHz	from £650
RACAL 1991 Universal Counter/Timer 160MHz 9 digit	£450
RACAL 9916 Frequency Counter 10Hz-520MHz	£150
RACAL 9906A Universal Counter/Timer 10Hz-200MHz	£200
MARCONI 2610 True RMS Voltmeter with GPIB	£650
SOLARTRON 7150 6½ Digit DMM True RMS IEEE (No handle)	£275
FLUKE 8840A Digital Multimeter 5½ digit True RMS	£500
FLUKE 77 Handheld Digital Multimeter 3½ digit	£75
RACAL 9301A True RMS Mv.Ivoltmeter 10KHz-1GHz	£275
PHILIPS PM5716 Pulse Gen 1Hz-50MHz +/- 20V	£450
PHILIPS PM5132 Sweep Func Gen 0.1Hz-2MHz Sine/Sq/Tri etc	£250
H.P. 3312A Func Gen 0.1Hz-13MHz AM/FM Sweep/Trig/Gate etc	£400
GOULD J3B Sine/Square Osc Ilator 10Hz-100KHz	£150
FARNELL LFI Sine/Square Oscillator 1Hz-1MHz	£75
TEKTRONIX 1485 Waveform Monitor	£400
PHILIPS 5567 Vectorscope with 5565 Waveform Monitor	£1000
LEADER LSG216 Generator AM/FM Stereo	£450
KENO VB73 Dual Variable Filter 0·1Hz-10KHz	£200
BRADLEY 192 Scope Calibrator	from £500
WAYNE KERR 4225 Automatic LCR Meter 0.25%	£450
WAYNE KERR B424 Digital Component Meter LCR	£150
RACAL 9008 Automatic Modulation Meter 1·5MHz-2GHz	£300
SAYROSA 252 Automatic Modulation Meter	£150
RACAL/DANA 9104 RF Power Meter 1MHz-1GHz 10mW-300W	£325
H.P. 3581A Wave Analyser 15Hz-50KHz LED Readout	£600
H.P. 8405A Vector Voltmeter 1MHz-1GHz	from £300
METROHM 9A Insulation Tester 500 Volts Analogue	£50
HUNTRON Tracker Model 1000	£125
AVO 8 Mk5 Multimeter	£700

POWER SUPPLIES

FARNELL AP100/30 0-100 Volts; 0-30 Amps Autoranging	£1000
FARNELL H30/100 0-30 Volts, 0-100 Amps	£800
FARNELL H60/25 0-60 Volts. 0-25 Amps	£400
FARNELL TSV70Mk2 70 Volts, 5 Amps/35Volts 10 Amps	£200
FARNELL L30-5 0-30 Volts, 0-5 Amps 2 Meters	£150
FARNELL LT30-2 0-30 Volts, 0-2 Amps Twice	£160
FARNELL L12-10C 0-12 Volts; 0-10 Amps	£175
THURLBY-THANDAR TSP3222 Programmable 32Volts 2Amps Twice	£500
H.P. 6515A 0-3KV, 0-6MA	£150
BRANDENBURG 472R +/- 2KV	£200

MANY OTHER POWER SUPPLIES AVAILABLE

BRUEL & KJOER EQUIPMENT AVAILABLE PLEASE ENQUIRE

NEW AND HARDLY USED TEST EQUIPMENT

OSCILLOSCOPE Model HC3502 Dual Trace 20MHz	Used £160 Unused £220
PANASONIC VP8177A FM/AM Sig Gen 100KHz-110MHz	Used £450 Unused £750
PANASONIC VP7673A Stereo Sig Gen PreSet memory GPIB	Used £400 Unused £700
KENWOOD FL180A Wow/Flutter Meter 0·003-10% 3Khz/3.15KHz	Used £400 Unused £500
GOODWILL GVT427 Dual Channel AC Millivoltmeter 10V-300V, 10Hz-1MHz	Used £100 Unused £125
GOODWILL GAG808G Audio Generator Sine/Square 10Hz-1MHz	Used £60 Unused £80
GOODWILL GFC8010G Frequency Counter 120MHz 8 digit	Unused £95
POWER SUPPLY Model HSP3010 Current Limiting 0-30V, 0-10Amps	Used £235 Unused 275
ANALOGUE MULTIMETER Model HC760TR AC/DC Volts; DC Current 10Amps: Continuity Buzzer; Transistor Tester etc	Unused £15

Used Equipment – GUARANTEED. Manuals supplied if possible.
This is a VERY SMALL SAMPLE OF STOCK. SAE or Telephone for lists. Please check availability before ordering.
CARRIAGE all units £16. VAT to be added to Total of Goods and Carriage.

STEWART of READING
110 WYKEHAM ROAD, READING, BERKS. RG6 1PL
Telephone: (0118) 9268041. Fax: (0118) 9351696
Callers Welcome 9am-5.30pm Monday to Friday (other times by arrangement)

Freephone;
0800 7310536

CRTs *for all Applications*

Flybacks *for all Monitors*

Components *for Monitors*

or 'PHONE **+44 (0)1789 766664**
+44 (0)1789 766665

or FAX **+44 (0)1789 764234**
+44 (0)1789 415243

~ A Quality Approved Supplier ~

VIDEO DISPLAY
7 ARDEN BUSINESS CENTRE ,
ALCESTER, Warks. B49 6HW, U.K.

ISO 9002 REGISTERED FIRM

VCR Clinic

Reports from
Eugene Trundle
Adrian Spriddell
Paul Hardy
Michael Maurice
Nick Beer
Chris Watton
Terry Lamoon and
Gerald Smith

TDK Tapes

A JVC HRD520 was brought in with the complaint that it would rewind only fifteen per cent of the tape, after which it would stop. Further goes with the rewind button had no effect. On test we found that the start-sensor photodiode voltage, which is normally 5V in darkness, fell to 3·8V as rewinding progressed. At this point the machine shut down.

The tapes were the cause of the problem. Four TDK ones, which were semi-translucent. When we shone torchlight through them we could see more light than with four other brands we tried. Hopefully this is a one-off batch problem. Has anyone else encountered this problem with TDK VHS tapes? **E.T.**

Akai VSG225

One rare occasions the cassette cradle would oscillate to and fro when a tape had been ejected. It wasn't possible to make a definite diagnosis, but a new mode switch and start tape-end sensor (righthand side) cured the fault. **E.T.**

Amstrad DD8900

There was no tape slack removal and the wind operations were erratic. As an alternative to a clutch arrangement, these decks have a limited drag lubricant applied to the reel arms during manufacture. With this machine the lubricant appeared to have become runny. As a result, it didn't apply sufficient torque to make or retain secure reel drive cog engagement. To resolve the problem we cleaned off the old lubricant and applied a coating of 'Kilopoise' which is available from Farnell. **A.S.**

Goodmans GVR3450

Tape chewing is a problem we've had with several of these machines, because of a warped play idler arm which has fouled the cassette tray baseplate. The arm is actally a Daewoo part, from the G1 mechanism. It's readily available from SEME as deck YC item no. 33. **A.S.**

Amstrad TVR3

Loss of the –27V supply from the VCR section prevented the TV section from working. We replaced zener diode D603 and the timer chip IC803, which was dragging down the –27V supply, fitting a 14DN487 in place of the 14DN332A, also the unnumbered 1N4148 protection diode that feeds it. After testing the unit for two days it was returned to the customer.

Two weeks later it was back again, with apparently the same fault. Couldn't be, we thought. But it was. All the same components had failed for the same reasons and were replaced FOC, this time together with the real culprit – the fluorescent display. **A.S.**

Sharp VCH81H

This machine would sometimes fail to make a timed recording. It had been seen by two of my colleagues during the previous couple of months for the same reason. The power supply had been checked thoroughly and the machine had been given a service, yet here it was again on the bench with the same problem.

Bearing in mind all that had been done, I wondered where to start. In the end I decided to replace the mode switch, even though the other modes all seemed to be OK. The machine then tested OK – but it always did! We returned it and asked the customer to report back if any more problems were encountered. A phone call to him some months later proved that all was well. **P.H.**

Goodmans GVR5500

Wind and rewind were very noisy – the reel idler kept jumping away from the reel turntables. The problem had been caused by a previous repairer, who had fitted an incorrect idler. I found that a refurbishment kit for the Sentra VX8500 had been used – because I attempted to use the same kit! It's the same superficially, but the reel idlers are slightly different when viewed from underneath. The Sentra idler has a larger diameter retainer disc, which fouls on the underside of the chassis as the idler reaches the end of its travel in the guide slot.

Spares for this model are available from Daewoo Electronics UK Ltd., Rathernraw Industrial Estate, 62-82 Greystone Road, Antrim, N. Ireland BT41 1NU (01849 469 696). **P.H.**

Akai VS55

This machine was dead. As there was ripple on all the major supply lines I replaced C6, C10, C15 and C17 – they all measured low value when checked with a capacitance bridge. At power up the machine still refused to do anything and there was no clock display. There was no response to front panel or remote control commands, and the machine wouldn't accept a cassette.

Both the oscillators associated

with IC900 were running, but there was no serial clock or data and there were no pulses on the switch strobe lines.

As I was working on it the deck started to shuffle and finally initialised. Everything except the clock then worked. If the power was disconnected from the machine and it was left for half an hour, the above process would be repeated.

I suspected IC900. When I went to remove the fluorescent display to get at the chip one of the end legs fell off. Someone had obviously had a go, and had broken the display while trying to get at IC900 – which hadn't been replaced. Whoever it was had even attempted to solder the broken ends back on to the bits of leg that were still visible at the edge of the display!

I replaced both items, then confidently powered up. But there were still no functions. After half an hour everything started to work. The cause of the trouble was eventually traced to transistor TR104 on the main board – it was dry-jointed. I had to remove the board to solder the joints, which are hidden beneath a couple of cables. TR104 provides the BU5V supply for the operations panel. **P.H.**

Roadstar 7272

This machine wouldn't drive the spools. The cause of the problem was the reel idler assembly. One of the pulleys incorporates a clutch assembly that makes it swing from the supply to the take-up spool. A new clutch assembly cured the fault. **M.M.**

Hitachi VTM640

There was loss of capstan lock because the control pulses were missing. They were not low in amplitude but completely absent, though the AC head didn't appear to be worn. Scope checks showed that the gain of the control pulse amplifier was low. C631 (47µF, 16V) was responsible for this, a replacement curing the problem. It's in the feedback loop.

I subsequently had another machine with exactly the same fault. **M.M.**

JVC HRD820

When a tape was inserted it would be loaded to the half-load position. If play was then selected the pinch roller would move down but the guides would stay where they were. On examining the underside of the mechanism I found that the pin and circlip which hold the plate assembly in position with the guide arm gears had come out. So I refitted it. Then, when play was selected, the machine jammed.

What had happened was that the machine had received attention elsewhere. The previous engineer had glued up the brass part of the entry and exit guides – and managed to glue the guides to the deck! I had to strip the guides from the deck, remove all traces of Superglue from the guides and the runners in the deck, then relubricate the runners and reassemble. This cured the problem.

If the brass part parts company with the guide, remove the guide, use one drop of Superglue and refit the brass part. Wipe any excess from the guide quickly. I normally remove the head drum assembly to refit the guides. Use the stoppers to attach them to the guide arm. Before returning the machine to the customer, check several times that the guides go to the play position fully. **M.M.**

Hitachi VTM830

This machine was dead, with fuse F852 blown. When a replacement had been fitted the machine accepted a tape but wouldn't lace up. The XRA6209 (BA6209) loading motor drive chip had failed. After fitting a replacement I found that the machine loaded very slowly. The cause was the loading motor, which was taking amps off load! A new loading block, which incorporates the motor and mode switch, cured the fault. **M.M.**

Toshiba V705

I've had a couple of brand new machines with no hi-fi sound. The cause of the problem has been that the lid earthing spring plate on the AV connection PCB across the back, behind the mechanism, is fitted incorrectly. The spigot is not located in the hole in the PCB, with the result that when it's fitted the earthing plate shorts out pin 1 of connector BN003 (the audio FF signal) to the lid. This means that the fault often clears when the lid is removed! **N.B.**

Akura VX150

This machine gave the impression that its heads had failed. As a replacement upper drum was in stock we fitted it, but there was no improvement to the picture. Further checks, around the head amplifier, revealed the cause of the fault: the snap-fit connector that joins the foil wire from the lower drum was loose. Effectively, only one half of the drum was connected. All that was required to restore the machine to full working order was to refit the connector. **C.W.**

Akai VS25

The playback picture was marred by thin lines that looked like the result of RF interference. I'd had a similar problem before, caused by defective capacitors in the power supply, but the symptom remained as bad after replacing all the electrolytics. To cut rather a long story short, the cause of the trouble was the MSM9565-3 chip IC202. **C.W.**

Toshiba Core Deck VCRs

If the problem with one of these VCRs is low gain or tuner drift, replace the tuner/modulator module. **T.L.**

JVC HRD860

The complaint with one of these machines was that playback was sometimes OK, sometimes there was only half a picture and sometimes none at all. The cure is easy: replace the 4·7µF, 63V capacitor on the head drum PCB. This is becoming quite a common fault with these machines. **T.L.**

Toshiba V703

There was no power and no display, no functions could be selected and a very slight whistle came from the power supply. A check on the supply lines showed that the Ever 14V supply was missing. The simple cause was that protector Z821 was open-circuit. **T.L.**

JVC HRD22

Intermittent tape damage was the complaint with one of these machines. On investigation we found that when the machine stopped from rewind the brakes didn't come one. As a result, tape was spilled out inside the machine. The mode switch was the cause of the trouble. **G.S.**

Samsung VIK310

When a tape was inserted this machine would sometimes jam and go to standby. Alternatively, when a cassette was ejected the indicator would sometimes keep flashing and the capstan motor would continue to turn. The mode switch was faulty. **G.S.**

Hitachi VT530

There was sound wow in both the record and playback modes. The capstan and pinch roller were both fine. I traced the source of the wow to the clutch assembly. **G.S.**

ELC EAST LONDON COMPONENTS
AUDIO TELEVISION VIDEO
COMPONENTS AT VERY KEEN PRICES
TEL: 0181-472 4871 FAX: 0181-503 5926

REMOTE CONTROLS FROM £7.99
IDLER TYRES 50p 1+, 25p 10+
VIDEO HEADS FROM £6.99
Over 200 models at very attractive prices.
AKAI, AMSTRAD, FERGUSON, FISHER, GOLDSTAR, HINARI, HITACHI, LOGIC, MATSUI, ORION, PANASONIC, SAISHO, SHARP AND MANY MORE
VIDEO SPARES

ASTRA 1 D CONVERTER
£16.99

Satellite Finder Kit PG-753

VCR TOOL KIT

TDA8178S REPLACEMENT
£7.99

BABY 10 REGULATOR
£11.99

FAULT FINDING BOOKS
EQUIVALENT BOOKS
JAPANESE TRANSISTORS
RESONATORS, THERMISTORS

HITACHI TH902	£2.00
96009	£1.30
TRIPLERS UNIVERSAL	£4.99
WITH FOCUS	£7.99
CUC2410	£16.99
POWER SUPPLY MOD KITS	
FUNCTION SWITCH	85P

0.60

RF PLUG & SOCKET

ELC EAST LONDON COMPONENTS
63 PLASHET GROVE, EAST HAM,
LONDON E6 1AD. TEL: 0181-472 4871
two minutes walk from Upton Park Tube Station
VISIT OUR SHOP
OPEN MON-SAT 9AM-7PM
100's OF TOOLS, COMPONENTS
INSTRUMENTS, REPAIR KITS,
BOOKS & CABLES TO CHOOSE FROM
ADD £1.50 P/P + 17.5% VAT
ALL GOODS DESPATCHED SAME DAY
PRICES SUBJECT TO CHANGE WITHOUT
NOTICE VISA ACCESS ACCEPTED. MIN
ORDER £5.00

LINE OUTPUT TRANSFORMERS
OVER 100 MODELS AT LOW PRICES

AKAI		**MATSUI**	
CT2570E	19.99	1420	16.99
GT2870	19.99	1442B	16.99
ALBA		1450	16.99
CTV14RS	19.99	1465	19.99
BABY 10	19.99	1480A	16.99
CTV741	19.99	**MITSUBISHI**	
AMSTRAD		CT2528ETX	16.99
CTV2200	14.99	CT2839ETX	16.99
CTV2210	14.99	**ORION**	
TVR12/4	16.99	14RX	16.99
BUSH		**PHILIPS**	
2020T	16.99	KT3	13.99
2714	16.99	KT4	16.99
FIDELITY		KT30	16.99
ZX2000	14.50	KT40	16.99
ZX3000	12.99	2A	16.99
FERGUSON		3A	16.99
TX85/86	16.99	CTX E/S	16.99
TX90		CF1	16.99
REDSPOT	16.99	NCR	16.99
WHITE	14.99	GR1-AX	16.99
TX98	19.99	G90 AE	16.99
TX99	16.99	**PANASONIC**	
TX100		TLF14520F	24.99
FST	16.99	TLF14521F	24.99
BLUESPOT	16.99	TLF14567F	24.99
GREEN	14.99	TLF14568F	24.99
YELLOW	16.99	TLF14584F	24.99
GOLDSTAR		TLF14586F	24.99
CBT4282	16.99	**SAISHO**	
HINARI		CT14R	16.99
CT4/5	16.99	CT141RB	16.99
CTV140	12.99	**SALORA**	
HITACHI		21C60	16.99
CPT1446	16.99	25C51	16.99
CPT1455	16.99	**SANYO**	
CPT1476	16.99	CBP2146	29.99
CPT1493	16.99	CTP3246	29.99
CPT1646	16.99	CTP6262	29.99
CPT2028	16.99	CTP7130	45.00
CPT2036	16.99	CTP7132	45.00
CPT2048	16.99	CTP7135	45.00
CPT2078	16.99	**SENTRA**	
CPT2084	16.99	GX9000	16.99
CPT2087	16.99	GX9700	16.99
CPT2158	20.00	**SHARP**	
CPT2174	16.99	C1410S	29.99
CPT2176	16.99	C3700	39.99
CPT2178	16.99	CT2810S	29.99
CPT2238	16.99	**SOLAVOX**	
CPT2248	16.99	16R19	16.99
CPT2276	16.99	20R19	16.99
CPT2476	16.99	22R19	16.99
CPT2478	16.99	26R09	16.99
ITT		**SONY**	
CT2613	16.99	KV1442	16.99
CT3306	16.99	KV1882	16.99
CT3325	16.99	KV2052	16.99
CT3425	16.99	KV2066	16.99
CT3835	16.99	KV2096	16.99
ST3487	16.99	KV21XRTU	16.99
ST35467	16.99	KV2204	16.99
TX2613	16.99	KV2212	16.99
TX3327	16.99	KV2217	16.99
TX3447	16.99	KV2704	16.99
TX3835	16.99	KV2705	16.99
COM 80R	16.99	KV2752	16.99
COM B	16.99	KV2756	16.99
DIGI 1-3	16.99	**TATUNG**	
MONOPRINT	16.99	TN8422	19.99
CVC25/32	9.99	**TOSHIBA**	
LOEWE OPTA		155T9BZ	16.99
ART 1	16.99	**ZANUSSI**	
CLAS M 124	16.99	20SM502	19.99
PROF S 28	16.99	22ST502	19.99
STUDIO 1	16.99	26ZT511	19.99
STUDIO S 28	16.99	AN3822K	7.99
STUDIO T 28	16.99		

AN5151	6.99	LA7835	1.99	STK5730	6.00	TDA1515	2.50
AN5435	2.50	LA7836	3.00	STK6962	5.80	TDA1516	4.00
AN5515	2.99	LA7837	3.00	STK7216	7.00	TDA1518	4.00
AN5521	2.99	LA7838	6.00	STK7226	8.50	TDA1520	4.00
AN5900	1.50	LF0059	30.00	STK7308	4.25	TDA1521	3.50
AN7161	3.40	M491B81	8.50	STK7348	4.50	TDA1552	7.00
AN7171	4.25	M49481	8.50	STK7356	9.00	TDA1554	7.00
AN7178	2.60	M5840A-84	16.00	STK8250	8.00	TDA1557	7.00
BA718	1.99	M54543L	2.99	STK73410	6.99	TDA1558	7.00
BA3402	3.99	M54544L	2.99	STR3125	5.99	TDA1908	1.00
BA3918	17.00	M54545L	2.99	STR4211	5.99	TDA2003	1.00
BA5402	2.50	M54548L	4.25	STR5412	4.50	TDA2005	1.30
BA6109	1.80	M54549L	4.50	STR6020	4.50	TDA2030	1.30
BA6121	2.99	M54644L	3.99	STR9012	6.00	TDA1675A	3.00
BA6122	1.99	M54647L	3.99	STR40090	6.00	TDA2575	2.00
BA6209	2.50	M54648L	3.99	STR44115	7.75	TDA2578	3.00
BA6219	2.99	M54649L	3.99	STR40090	5.99	TDA2579A	2.50
BA6222	1.99	MC13306T3	3.99	STR50020	6.50	TDA2582	3.00
BA6229	2.80	MC13309T3	3.99	STR50103	4.99	TDA2600	5.75
BA6238	1.99	MDA2062	4.25	STR50115	6.50	TDA2653A	3.50
BA6239	2.50	PAL002A	16.00	STR54041	5.50	TDA3505	4.00
BA6304	1.90	STRM6549	11.00	STR55051	8.50	TDA3560	3.25
BA6305	1.90	STK433	4.99	STR58041	5.50	TDA3561	3.50
BA6289	2.99	STK435	6.50	STR59041	6.50	TDA3562A	4.00
BA10324	1.99	STK459	8.50	STR10006	6.00	TDA3565	3.00
BA10358	1.80	STK461	10.00	STR01806	6.00	TDA3576B	9.00
BA15218	2.20	STK463	10.00	STRD5541	7.99	TDA3640	4.00
CNY65	4.99	STK465	10.00	STRD6008	8.00	TDA3650	10.00
CNY75	2.99	STK0040	7.00	SAA1025	6.00	TDA3651	2.00
CNX62A	2.99	STK0060	9.99	SAA1250	3.50	TDA3653	2.99
CNX82	3.99	STK2029	5.99	SAA1251	4.50	TDA3654	1.99
CNX83	2.99	STK2048	11.00	SAB3037	9.99	TDA3300	5.00
HA1377	2.99	STK22129	8.50	SAA1291	9.00	TDA4500	3.75
HA1397	2.60	STK2250	8.00	SAA1293-03	8.50	TDA4501	4.75
HA11225	1.99	STK3041	6.00	SAA1294-03	13.00	TDA4502	5.00
HA11227	2.20	STK3042II	6.50	SAA5000	2.50	TDA4503	5.60
HA11235	1.99	STK3082II	7.00	SAA5010	4.30	TDA4605	3.00
HA11423	2.20	STK4026	9.00	SAA5012	6.00	TDA8380	3.00
BA3910B	12.99	STK4121II	8.50	SAA5020	3.50	TDA4504	4.99
HA11717	4.75	STK4122	8.00	SAA5030	4.99	TDA4505E	5.99
HA11753	5.99	STK4131II	6.50	TA7205	1.00	TDA4505M	12.99
HA11758	5.00	STK4132II	7.00	TA7222	1.20	TDA4600	1.99
HA13001	1.95	STK4141II	6.50	TA7240	2.50	TDA4601	1.99
HA1312B	4.25	STK4141V	8.00	TA7241	2.60	TDA4950	1.99
HA13108	3.50	STK4142II	7.75	TA7264	4.99	TDA6200	8.00
HA13117	2.99	STK4151II	8.00	TA7269	5.50	TDA7240	3.00
HA13118	2.99	STK4152II	9.00	TA7270	2.50	TDA8170	2.99
HA13119	2.99	STK4161II	9.99	TA7271	2.50	TDA8175	2.99
HA13402	3.25	STK4162II	8.00	TA7273	3.50	TDA8178	4.25
HA13403V	5.50	STK4171II	9.99	TA7279	4.00	TDA8185	5.00
LA4182	1.99	STK4172II	9.00	TA7280	2.99	TDA8190	3.00
LA4270	2.99	STK4181II	9.99	TA7281	2.75	TDA8380	2.60
LA4282	6.00	STK4182	9.99	TA7283	2.60	TPU2732	19.99
LA4440	2.20	STK4191II	9.99	TA7288	4.25	TMS47C432	15.00
LA4445	2.60	STK4192	9.99	TA7293	4.50	UPC3842	2.50
LA4460	1.60	STK4372	6.00	TA7299	3.99	UC3844	2.50
LA4461	1.60	STK4392	7.50	TA7680	4.00	UPC1378	2.20
LA4465	2.99	STK4853	9.99	TA7699	8.50	UPC1394	1.90
LA4466	2.99	STK5315	6.50	TA8200	4.99	UPC1420	5.25
LA4475	2.99	STK5325	7.00	TA8201	3.50	UPC1488	3.50
LA4476	2.99	STK5332	3.50	TA8207	3.25	UPC1185	6.00
LA4495	3.95	STK5353	10.00	TA8210	3.50	UPC1188	4.00
LA4496	3.99	STK5338	3.99	TA8214	3.50	UPC1230	2.10
LA4500	2.30	STK5342	5.99	TA8215	3.99	UPC1238	1.80
LA4505	2.60	STK5372H	8.50	TA8216	4.25	UPC1498	3.50
LA4508	2.60	STK5421	7.00	TA8220	6.75	SG264A	7.00
LA4700	3.99	STK5422	6.50	TA8221	6.75	UPC1277	2.40
LA6324	3.50	STK5434	7.00	TA8400	3.99	UPC1278	2.40
LA7330	4.99	STK5436	8.00	TA8659N	12.99	UPC1288	4.00
LA7520	4.99	STK5446	10.00	TEA1039	1.99	UPC1298	4.00
LA7522	6.50	STK5451	7.00	TEA2018A	3.00	UPC1310	8.00
LA7530	3.99	STK5466	8.50	TEA2029C	4.00	UPC1335	4.00
LA7800	1.80	STK5471	4.99	TEA2164	3.00	UPC1318	4.00
LA7801	1.95	STK5476	6.99	TEA2165	4.00	UPC1363	3.00
LA7802	1.85	STK5481	6.00	TDA1044	2.50	UPC1364	5.00
LA7820	3.50	STK5482	4.99	TDA1082	9.50	UPC1365	3.25
LA7830	1.99	STK5490	5.50	TDA1170	1.20	UPD1937C	4.25
LA7832	3.99	STK5720	6.00	TDA1510	3.50		

DEGUSSING ROD
£29.99

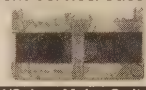
VHS ALIGNMENT TAPE
BAND TRACKING, TAP TRANSPORT, FM PICTURE CURVE, AUDIO SYNC HEAD AZIMUTH TRACKING PLAYBACK SWITCHING POINT
£39.99

PATTERN GENERATOR
Colour bar, Cross hatch, Staircase.
COMPACT PORTABLE
£84.99 only

Capacitance Meters
Capacitance Meter PG015

An accurate, capacitance meter providing measurements over a very wide range.
0TO 2000UF
ACCURACY 0.5%
£29.99

Transparent Service/Cassette
£6.50

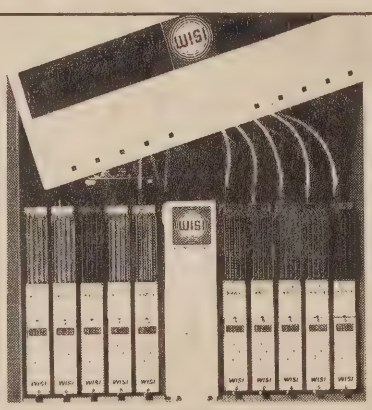


Hitachi/Salora Mains Switch
£1.99

REMOTE TESTER **£14.99** LOPT TESTER **£29.99** FREQUENCY COUNTER **£99** SOLDERING STATION **£50.00**
SATELLITE FINDER KIT **£29.99** MICROWAVE LEAK DETECTOR **£14.99** DIGITAL MULTIMETER FROM **£9.99**

The headend that says YES to

- *Quality*
- *Ease of use*
- *Agility*
- *Each module an almost total entity*
- *Superb value*



WISI TOPLINE HEADEND

Never before has it been possible to offer – at competitive prices – a superior, easy-to-use headend range with high quality channel processing that allows the user to retain perfect vision and sound. WISI's breakthrough in headend modular design has processors for satellite TV, terrestrial TV and radio. Each individual module incorporates its own control system enabling quick and easy set up. These channel processors come together in an "all-in-one" base unit which contains all necessary accessories for ease of ordering – no additional items required!

CHECK THESE FEATURES

- Frequency agile freely selectable in the VHF or UHF range.
- Adjacent channel capable.
- B/G, D/K, I, L, M TV standards
- Modular system for headend stations in SMATV and CATV systems.
- Modular for satellite TV, terrestrial TV, FM and satellite radio, SAT IF converters, TV modulators.
- Individually programmable modules.
- High output level.
- Wall mounting or 19" rack mount with lockable cabinet door.

U. K. STOCKIST

J.W. HARDY

WISI

A Breakthrough in Headend Design

May we send you full details?

J. W. HARDY COMMUNICATIONS, 231 Station Road, Birmingham B33 8BB Telephone 0121 784 8478 Fax: 0121 789 7931

P.V. TUBES

104 ABBEY STREET, ACCRINGTON, LANCS. BB5 1EE
Tel: 01254 390936/236521 Fax: 01254 395361

TRADE COUNTER OPEN MON-FRI 9-5. SAT 9.30-12 NOON. CLOSED ALL DAY WED.

Please add VAT 17.5% to all prices. We accept payment by cheque. Cash, Access, Visa. Add £2 pp for orders up to 1K. Heavier parcels add £4. Next day delivery on LG. Consignments POA. Goods will be despatched on the day we receive your order. If we are out of stock we will inform you ASAP. Please allow up to 28 days delivery.

CROWN TV/VIDEOS

10" AC/DC CTV	£163.00
14" RC CTV UHF/VHF	£122.00
14" RC UHF/VHF text	£145.00
21" RC	£184.00
21" RC text	£199.00
21" RC Nicam text	£225.00
28" RC Nicam text	£375.00
33" RC Nicam text	£749.00
Twin speed VCR with video+	£150.00

SATELLITE NEWS

60cm dish, wall mtd, boxed	£21.95
80cm dish, wall mtd, boxed	£39.95
Standard LNB	£24.95
Enhanced LNB	£24.95
0.8db enhanced LNB	£29.95
Digital universal 0,7db	£35.95
Twin enhanced LNB	£45.95
Multi LNB holder	£15.95
Astra ID converter	£19.95
D2 MAC decoder	£130.00
Pace MSS 100 rec. only	£120.00
Pace MSS 300 rec. only	£170.00

CHANNEL 5
JBX HIGH GAIN AERIAL WIDE BAND OR GROUP A/B/CD
£22.95 + VAT

PV Tubes has been established for 20(0) years and has supplied the TV and electronics trade with components and service aids since it began. In a continuing effort to maintain the industries requirements it is our intention to make available an increasing range of specialised service aids and skills.

The PV1 multi-purpose degaussing coil is an example of our commitment to supply quality product at competitive prices. The PV1 degaussing coil is intended for use with a 240v mains supply, although a 120v version is available upon request. This compact and cost effective unit will have major interest to TV Service Departments, TV manufacturers, TV Sales and Rental Companies, TV Broadcasting Authorities, Universities and Colleges, The Armed Forces, Aviation and Computer Companies.

Specialised degaussing systems can be designed and manufactured to suit specific applications within many engineering environments.

As part of the strategy in supplying specialised skills within the electronics industry, we are able to offer design, consultancy, and manufacture of electronic products, specific to those larger customer requirements.

SPECIAL BUYS
Qty(10)
UK MOULDED 13A computer main lead – mtr.0.99 each
13A Fig 8 mains lead – 2 mtr. 0.99 each

WE ALSO STOCK
TVs
VIDEOS
SATELLITE SYSTEMS
LNB/DISHES
REMOTE CONTROLS
VIDEO HEADS
SEMICONDUCTORS
VALVES
SCANNERS
AERIALS
FUSES
RESISTORS
CAPACITORS
LEADS
CABLES
SECURITY SYSTEMS
VIDEO TAPE
WALL BRACKETS
MULTI METERS
PLUG/SOCKETS

IF WHAT YOU NEED ISN'T LISTED – ASK! RING SHEILA OR EMMA

There are important differences between the operation of a monitor and a TV set. These differences can cause problems for those not aware of them. Russ Phillips provides essential guidance for the newcomer to monitor repairs

Servicing Computer Monitors

About six months ago I started a new job with the local education authority. It involves repairing TV sets and VCRs, as I've been doing for most of my working life, and also computer monitors. The prospect didn't worry me as, like most TV engineers, I thought that a monitor was simply a TV set without the tuner/IF section. Over the last six months however I've discovered that there are important differences. Some, if you are not aware of them, can cause difficulties.

The purpose of this article is to help other TV engineers who wish to take on the repair of computer monitors. Hopefully it will enable them to do so without the teething problems that I had. I'll concentrate on the differences between monitors and TV sets, and not go in detail into areas where they are very similar – assuming that readers will already know about TV receiver repair.

Test Signals and Equipment

Before discussing the operation and repair of monitors, we'll consider the test signal required. Some sort of test signal is essential as, unlike a TV set, many monitors will not run unless a signal is applied to the input – the frame and line oscillators will not work without the presence of sync pulses.

Unfortunately your trusty old signal generator will probably be of no use when it comes to computer monitor repair. Different monitors use different video systems (CGA, EGA, VGA etc.): each one has different line and frame frequencies. Typical frequencies are listed in Table 1. Note that the values are not fixed. This is especially the case with SVGA monitors, which can operate at line frequencies anywhere between about 35·2 and 48·5kHz.

An added complication is presented by the fact that both 9- and 15-pin D plugs are in use to connect the output from the video board in the computer to the monitor.

One option is to use a PC as a test signal provider. This can be a cheap option if you already have a PC in the workshop, especially as software that will generate all the most widely used test patterns can be purchased very cheaply. The main disadvantages are that a PC is bulky, and that only those monitors which will interface with the video board in the PC can be tested.

The other option is to purchase a specially-designed monitor signal generator. Ideally this should be able to drive both digital (TTL) and analogue monitors, have 9- and 15-pin D sockets, and cater for all the video systems listed in Table 1. If you cannot afford a generator which can do all that, the most important points are a 15-pin D socket and the ability to drive VGA and

continued on page 794

Table 1: Monitor video systems.

System	*Line frequency*	*Frame frequency*
CGA	15·75kHz	60Hz
MDA/Hercules	18·432kHz	50Hz
EGA	21·85kHz	60Hz
PGA	30·5kHz	60Hz
VGA	31·5kHz	60 or 70Hz
SVGA	35·2-48·5kHz	56 or 60Hz
8514A/XGA	31·5kHz	60Hz
XGA	31·5kHz	70Hz

Test report

Channel Master 1005IFD Satellite Signal Level Meter

An upmarket meter at a downmarket price. Mike Hancox, Technical Director of Satellite Scene, finds this meter robust, accurate, sensitive and inexpensive

It is not often that a top brand company takes a chance and plunges into something quite separate from its usual products. But once in a while the gamble is taken. If the development is a success, it deserves our support.

Channel Master has recently done just this. The company is one of the world's leading manufacturers of satellite dishes and accessories. How it came to decide that there was a lively market for a low-priced satellite signal strength meter baffles me, especially as so many inexpensive meters are already available. But the result is a winner.

We came by the meter quite by chance, as manufacturers usually send us products to try out, looking for feedback from the sharp end of the business. I happened to be at Eurosat Distribution in Walsall on the day when this meter was first put on display. The usual "what do you think of?" conversation started.

A Bargain

There was only one way to find out. We needed a new meter for the Dinky toy side of our satellite installation business. So rather than wait for one to come in for review, I actually bought one! This has enabled us to test the meter properly over an extended period of time, throughout the whole range of our activities.

The paying up bit was a pleasant surprise. I'd estimated the trade price at around £200 (Eurosat had not even had time to produce a price ticket). When the computer finally came up with a price for this new item, at well under £100, it was a very pleasant surprise indeed.

That was day one. We've handled a large number of alignments since then, and still feel that we got a bargain. Why? Because it's a totally reliable, bomb proof, foolproof, easy to use meter with comprehensive facilities. It is tough enough to be dropped from a great height without damage and be soaked in the rain without detriment; sensitive enough to be used with weak satellites such as Eutelsat II F4 at 7°E; and has a range of features that would not be out of place in a meter costing around £300.

Features

What you actually get for your money is as follows: a whacking great analogue dial for visual signal peaking; an audio tone for peaking when you can't see the dial; 13/18V switching; a battery test reading; a receiver output voltage reading; an LNB consumption reading in mA; signal level on/off and audio tone on/off switching; LEDs for 13/18V indication; LNB signal input via an F connector; receiver power input via an F connector; a separate gain/attenuator control knob; a plug-in AC/DC adaptor/charger; a really substantial metal Tonka case; a tough carrying handle; a separate shoulder strap; and change out of £100!

On Test

We tested the meter on all kinds of installations every day and in all types of weather for over two months before writing this review. During this time we found that the meter was totally accurate and consistently sensitive, even with the lower power available after very long use.

We have been particularly impressed with the range of the gain/attenuation control and the audio tone alignment option. The latter is really useful when you are atop a set of triple ladders in the pouring rain and it is hard enough to hang on, let alone try to read an analogue dial.

The LNB consumption button has been a great help for detecting faulty LNBs. We have also used it in conjunc-

'112 Jan17 10:08:38

TELEVISION SET ONLY £30

To be certain you receive the leading UK consumer electronics journal next month and every month, subscribe today!

- **Free postage**
- **Priority despatch**
- **Subscribe for 24 or 36 issues and SAVE!**

☐ 12 issues (1Yr) £30 UK (Europe £46, Rest of World £52)
☐ 24 issues (2Yrs) £54 UK - SAVE 10%
☐ 36 issues (3Yrs) £72 UK - SAVE 20%

IN EVERY ISSUE

- News, equipment reviews, components, servicing solutions, business-building ideas
- Television, VCR, satellite, CDs, PCs, consumer electronics
- State of the art reports on digital TV and other developments

MONEY-BACK GUARANTEE OF SATISFACTION

If you are not completely satisfied with TELEVISION within the first 90 days we'll refund your money in full – no questions asked.

If you're an electronics professional you need to see 'Television' regularly!

Please allow 28 days for delivery of your first issue.

☐ Please tick here if you not wish to receive direct marketing promotions from other relevant companies.

TV97A

FOUR WAYS TO PAY

1 I enclose a cheque for £ _____ made payable to TELEVISION

2 Please charge my Access / Visa / AMEX – Expiry date _____ / _____

_____

3 Please invoice me / my company ☐

4 Or alternatively phone our credit card hotline on +44 (0) 1444 445566

Name _____

Company Name _____

Company Address _____

_____

_____

Postcode _____

Telephone No. _____

Signature _____ Date _____

Return to: TELEVISION subscriptions, FREEPOST RCC 2619, PO Box 302, Haywards Heath, West Sussex, RH16 3BR.
NO STAMP NEEDED IF POSTED IN THE U.K

046

tion with the gain control to obtain accurate assessments of the performance of LNBs.

Nice touches are the ability to switch off either the audio tone or the analogue dial reading, and the separate tone that sounds automatically to confirm completion of the circuit prior to the use of the gain control.

We also liked the ability to use either internal batteries or the receiver's LNB supply to power the meter. Use of the receiver's supply would be useful if your batteries were running a bit low, though it must be said that we never had this problem. It is really nice to be able to complete a full motorised system alignment using the internal batteries, without the need of a feed from the receiver – a feature you normally get with only the more expensive meters.

The button that selects either 13V or 18V for an LNB provides a neat way of checking whether it has lost the horizontally or vertically polarised channels. This is a very common fault: it's easier to detect when you have this meter.

Verdict

All in all this is a really good all-round meter that's worthy of the name Channel Master. A full back up service is provided. You can't realy go wrong at the price. Why not treat yourself?!

For further details contact Channel Master (UK) Ltd., Premier Business Park, Whitebirk Industrial Estate, Blackburn, Lancashire BB1 5UE – telephone 01254 680 444, fax 01254 672 299. Eurosat Distribution can be reached on 0192 239 299.

DO YOU OFFER A RADIO DECODING SERVICE TO YOUR CUSTOMERS?

If not, you could be losing out on a very lucrative additional source of income - especially if you already service car audio equipment.

The Joule A-400 radio decoding system has now proven itself as the most cost effective solution to all your decoding requirements. This CE approved, easy to use computer based system is now being sold overseas to Service Departments and Police Forces. It can now be supplied with the software to decode most of the latest RDS radios that contain their security codes within the main processor chip, as well as the more familiar eeprom based models.

Purchase the Starter Kit which includes bundled software to decode over 100 models for £375.00 + vat (additional software is available separately). Or, the Index Reader version which includes ALL available software for £275.00 + vat and covering literally hundreds of models (codes are supplied by phone or fax and cost £5.00 each or £10.00 for the Blaupunkt RDS models). You may also opt for a combination of the two systems tailored to suit exactly your requirements which can lead to even more profitability.

Contact us now for a free brochure and demonstration disk (please state 3.5" or 5.25"), or visit us at our factory for a full demonstration.

Electronic Sound Systems

Hilton Road, Aycliffe Industrial Estate
Newton Aycliffe
Co. Durham DL5 6EN
United Kingdom
Tel: 44(0)1325 307442 Fax: +44(0)1325 300189
Email: elecsys@elecsys.demon.co.uk

A Visit to Dolby Laboratories

For a long time Dolby Laboratories was seen primarily as a cinema sound and hi-fi company. Dolby is also involved in the TV, home cinema, DVD and HD-TV markets however. George Cole recently visited the Dolby headquarters in San Francisco to catch up on the latest developments

Ray Dolby, an American engineer and physicist, founded Dolby Laboratories in 1965. He had been a member of the group of engineers at Ampex who, in 1956, developed what was the world's first practical videotape recorder, the Quadruplex. It used an FM recording system and ran 2in. tape past four video heads which were mounted on a drum that rotated at 240 times a second, laying down transverse tracks on the tape. The Quadruplex became the standard videotape recorder in broadcast studios across the world.

Noise Reduction

Dolby Laboratories was founded to develop noise-reduction systems for the professional and consumer markets. Its best-known system in the domestic market is probably Dolby B, which was introduced in the Seventies. The system helps to remove tape hiss by applying non-linear pre-emphasis in the recording process. This, basically, boosts the HF audio signals being recorded, a complementary de-emphasis system being used to reduce their level, along with much of the tape noise, during playback.

Dolby B became in effect the standard audio cassette noise-reduction system, despite the development of more powerful versions (Dolby C and S), and remains the dominant format. Although rival noise-reduction systems were developed, they gained only a small foothold in the market and subsequently died off.

Dolby B was also used by a number of mono and linear stereo VHS recorders in the early Eighties. But the introduction of hi-fi VHS – and consumers' acceptance of hiss with mono machines – led to Dolby becoming obsolete in the home VCR market.

Licensing

Dolby is probably best known for its licensing operations. But a presentation given by company executive Ed Schummer revealed that licensing accounts for only around thirty per cent of the company's income, the manufacture of processors, recorders and encoders accounting for the major share (sixty per cent). The remaining ten per cent comes from services to the recording and film industries.

There are over 600 million Dolby licensed products in use worldwide, with 2,500 hardware licences and over 300 patents in 34 countries. A clever move was the registering of the Dolby trademark, because when the patents run out the company's unlicensed competitors cannot advertise the fact that they are using Dolby products!

There are three potential areas for collecting licensing fees: from chip manufacturers, hardware manufacturers and software companies. In practice Dolby collects royalties only from hardware companies, such as manufacturers of AV amplifiers or Surround sound TV sets. Dolby argues that this strategy encourages chip companies to develop ICs that can then be used by the hardware companies. Dolby is used by software companies as a quality mark.

Dolby Surround

The Dolby Stereo system was introduced in 1976 and became the accepted sound system in the cinema world: over 7,000 films have been encoded with it. Dolby Stereo is a matrix system that adds two extra channels (centre for dialogue and surround for effects) to a conventional two-channel stereo signal. The extra channels can be transmitted with a stereo signal such as Nicam, and can be recorded on VHS tapes and LaserDiscs. There are more than 700 audio CDs and over fifty video games encoded with the system.

The advantage of the system is that a Nicam transmission that carries Surround sound information is compatible with all TV receivers: a mono set will provide a

mono replay signal, while a Nicam stereo set will ignore the Surround sound information and produce two-channel, stereo sound. A set with a built-in Dolby decoder, or one that supplies a stereo output to an external decoder, will enable the extra channels to be extracted. Similarly VHS tapes encoded with Dolby Surround sound information are compatible with all types of VCR. This has given rise to a lively home cinema market.

Two analogue Dolby Surround systems have been released on the consumer market. The first to arrive, Dolby Surround, offered left, right and surround channels. It has been superseded by Dolby Pro Logic, which offers left, centre, right and surround channels. Toshiba launched the first Dolby Surround TV sets in the early Nineties, while Hitachi was first to introduce Dolby Pro Logic sets. A number of companies have launched stand alone Dolby processors as part of home AV/cinema systems. Of the 26 million Dolby Surround decoders in use worldwide, half of them are in the USA where home cinema is big business. Two million are in the UK. Dolby dominates the analogue Surround market: it faces a greater challenge in the digital field.

Quality Control

Martin Lyndsey, general manager of Dolby's Quality Assurance Division, explained how the company checks all products that bear its name. Part of the licensing agreement includes a clause that gives Dolby the right to test products and to demand improvements wherever this is considered necessary. Much of the equipment that Dolby tests is supplied by manufacturers. Dolby also buys equipment off the shelf however, visits production centres and selects hardware at random.

Testing is carried out by about a dozen engineers. It's interesting that 39 per cent of products fail the initial evaluation. Testing is exhaustive. For example a Dolby processor undergoes 25-30 tests involving over a hundred measurements. Some failures are caused by cost-cutting measures adopted by manufacturers. These started with production being moved to low labour cost countries, and continued with the use of fewer and then lower-quality components.

Dolby Digital

The Surround sound market is no exception to the relentless move in the digital direction. During the Eighties Dolby developed two algorithms that use a perceptual coding system (see later) to compress or reduce the quantity of data required for digital audio playback. The AC1 system was first used for satellite TV transmissions in the USA and Australia. AC2 was used in professional markets.

Steve Vernon of Dolby Laboratories gave an excellent presentation on the most important system, AC3 – much of the information presented here is derived from it. Work on AC3, which is aimed at the cinema, broadcasting and consumer markets, began in 1991. Indeed AC3 is part of the DVD specification and the US Advanced Television Systems Committee specification for digital HD-TV. Systems that use AC3 coding are known as Dolby Digital. The system offers data rates between 32 and 384kbits/sec, providing various options from mono sound to stereo sound with up to six discrete channels.

Data Compression

Data reduction is required because a PCM (pulse-code modulated) audio system uses comparatively large amounts of data. Take for example a digital audio system that has 48kHz analogue signal sampling followed by 16-bit digital coding to provide a two-channel stereo

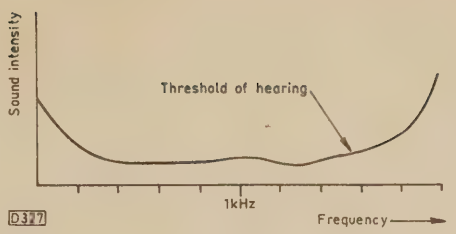


Fig. 1: The threshold of hearing curve. Human hearing sensitivity decreases at lower and higher audio frequencies.

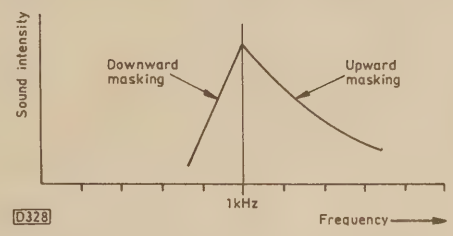


Fig. 2: Frequency masking. Louder sounds mask quieter ones, the effect working in both the HF and LF directions.

signal – DAT for example. This will result in a data rate of 1·536kbits/sec (48k x 16 x 2). For six-channel sound the data rate expands to 4·608kbits/sec.

There are basically two types of data compression system, lossless and lossy. The former produces decoded data which is identical to that entering the encoder. The advantage is that the output, e.g. an audio signal, is indistinguishable from the original. The disadvantage is that there is only limited scope for data rate reduction – it tends to rely on factors such as redundancy. A typical compression ratio is 2:1. With a lossy system the decoded output is not identical to the original signal, though the results can be acceptable to the end user – some say that smart encoding can result in the end user finding it impossible to tell the difference between the compressed and the original data. This is what AC3 does – so do other compression systems on the market, such as Sony's ATRAC (Adaptive Transform Acoustic Coding) which is used with Mini Discs. Incidentally ATRAC uses some Dolby patents.

Perceptual Coding

AC3 is a perceptual coding system. The difference between the data output and the original data is known as the quantisation noise. Perceptual coding systems work by exploiting the limitations of human hearing to shape the quantisation noise so that it is inaudible. As a result, compression ratios between 8:1 and 12:1 can be achieved.

The sensitivity of the human ear is less at low and high frequencies, sound below the threshold of hearing (see Fig. 1) being inaudible. Dolby AC3 makes use of a phenomenon known as frequency domain masking – basically, a louder sound makes a quieter sound inaudible. This masking works in both directions from the frequency point of view, i.e. quiet higher frequencies are masked by loud lower ones and vice versa, see Fig. 2. Another phenomenon, known as critical band frequency resolution, makes use of the fact that human hearing has finite frequency resolution, certain frequency bands sounding alike. This means that some bands can be removed without the overall sound being affected.

The key to successful perceptual coding lies in the development of algorithms that come close to matching the characteristics of human hearing. Dolby's perceptual coding algorithms have been designed so that they can be adapted as the technology improves.

Encoding and Decoding

A simplified illustration of the operations carried out in a Dolby Digital encoder is shown in Fig. 3. The ana-

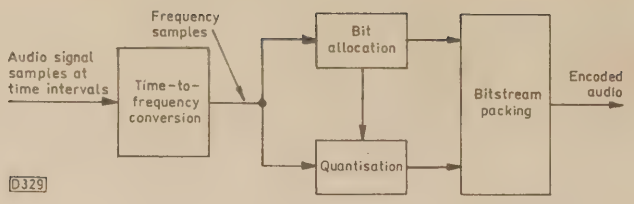


Fig. 3: Basic Dolby Digital encoding.

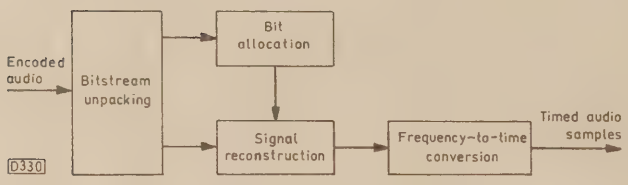


Fig. 4: Basic Dolby Digital decoding.

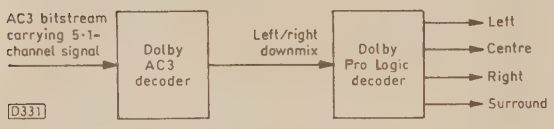


Fig. 5: How Dolby Digital works with Dolby Pro Logic to provide multi-channel sound.

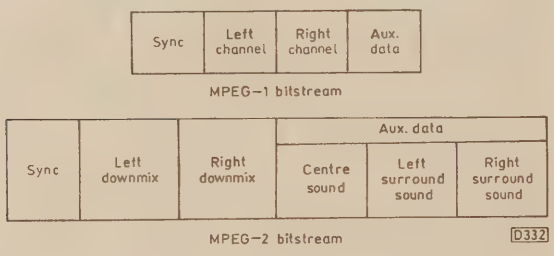


Fig. 6: MPEG-1 and -2 bitstreams. The MPEG-2 system is designed so that the decoder can also read MPEG-1 signals. The left MPEG-2 down-mix consists of L + 0·7C + 0·5LS. The right down-mix has the same proportions. C = centre channel sound, LS = left surround sound, RS = right surround sound.

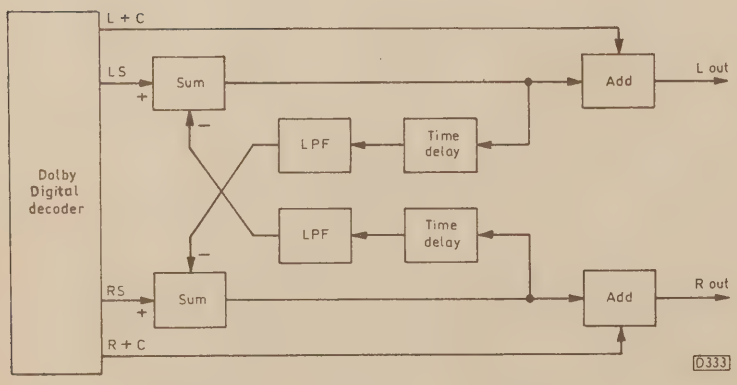


Fig. 7: Virtual Dolby Surround processing. Application of cross-cancellation to the Surround signals and mixing with the front signals.

logue audio signal is first sampled, producing a series of samples at time intervals. These are converted to frequency samples, using a modified discrete cosine transform (MDCT). This is a version of a Fast Fourier Transform (FFT), which uses complex mathematical calculations and processing to convert a waveform into a series of harmonic functions.

The bit allocator determines how many bits are to be used for each frequency sample. After quantisation, which rounds each frequency sample to the specified number of bits, the samples are packed into a bitstream.

The Dolby Digital decoder (see Fig. 4) unpacks the bitstream, analyses how many bits were used for each frequency sample, and then reconstructs the signal. An inverse MDCT transform is used to convert the frequency samples back to time samples.

Results

The result of all this is that Dolby Digital can provide a mono signal using a data rate of just 96kbits/sec (an 8:1 compression ratio), a two-channel stereo signal using a data rate of 160kbits/sec (a 10:1 compression ratio), or a 5·1-channel Surround sound signal (left surround, left, centre, right, right surround and sub-woofer) using a data rate of 384kbits/sec (a 12:1 compression ratio).

Dolby Digital also offers a decoder down-mixing facility. In other words, if you feed a 5·1-channel signal to a decoder that's connected to fewer than six speakers, down-mixing is used to combine channels. If there are more speakers than there are coded channels, the unused speakers are muted.

The system works with Dolby Surround. A 5·1-channel signal can be applied to an AC3 decoder to provide a down-mix for feeding to a Dolby Pro Logic decoder which produces multi-channel sound, see Fig. 5.

Marketing

Dolby Digital was launched in the cinema market in 1992. Some 9,000 cinemas worldwide have installed the system, and about 900 films are encoded. The Dolby Digital data is inserted in blocks in the gaps between the sprocket holes at the edge of the film print. It is clever technology, but Dolby Digital faces strong competition from another cinema digital surround sound system called DTS.

In December 1996 the US Federal Communications Commission (FCC) announced that Dolby Digital was to be used as the audio system in the US digital HD-TV format developed by the Advanced Television Systems Committee. ATS is expected to be launched in 1998. The US cable industry has also opted to use Dolby Digital. So has the Primestar satellite TV service.

Dolby has been pushing AC3/Dolby Digital in the consumer market. About 200 LaserDisc titles feature Dolby Digital sound. This feature is possible only with NTSC discs however – they have room in the waveform to accommodate the AC3 soundtrack. Conventional NTSC LaserDiscs carry analogue video plus two FM sound channels and PCM sound. This ensures compatibility with older LaserDisc players, which offer only analogue video and sound. To add Dolby Digital to a LaserDisc, one of the FM channels is used to store the data. The result is a LaserDisc which has PCM sound, Dolby Digital and a mono FM sound channel. The first Dolby Digital LaserDiscs were launched in the USA in 1995: millions have since been sold.

About seventy companies market Dolby Digital decoders for the home market. They include Denon, Kenwood, Pioneer, Technics and Yamaha. Toshiba has

Quality control testing at Dolby Laboratories.

announced plans to launch TV sets that cater for Dolby Digital 5·1 audio.

Dolby Digital is part of the DVD specification, but there is some controversy here. The format is mandatory for DVD discs intended for NTSC markets, but is optional for PAL DVD discs which must use MPEG-2 audio. This split was called for by European manufacturers, who wanted DVD to be backwards compatible with MPEG-1 audio, as used by Video CD and CDi.

Dolby argues that its system is superior. For example in order to remain backwards compatible, the MPEG-2 bitstream consists of a left and a right channel down-mix that can be read by an MPEG-1 decoder, see Fig. 6. An MPEG-2 decoder also reads auxiliary data which provides it with centre, left surround and right surround data. Dolby argues that the quantisation noise is different for each channel, and thus doesn't cancel. In addition MPEG-2 uses a higher data rate (640kbits/sec compared with 384kbits/sec) to avoid artifacts when the channels are extracted from the matrix.

In practice there is little to chose between the two systems. But few would dispute that Dolby has done a good job in marketing Dolby Digital.

Virtual Dolby Surround

Roger Dressler, Dolby's technical director, talked about the company's latest development, Virtual Surround sound. Basically this means attempting to create Surround sound effects from a pair of built-in TV receiver speakers.

A number of companies which market Surround sound receivers have found that many consumers like the idea of Surround sound but not the idea of extra leads and speakers in the home. JVC was the first company to tackle this problem, with its 3D Phonic system. Although the format was criticised by many home cinema reviewers, it has been popular with the public. So much so that other companies, including Hitachi, Panasonic and Sharp, have launched sets that offer a similar feature.

Dolby has now decided to joint this market. Its Virtual Dolby Surround system was originally developed for the PC market, the idea being that computer users with games and multimedia software could have the benefit of surround sound effects from a pair of PC speakers. Virtual Dolby Surround is now being aimed at the TV market as well.

Virtual Dolby uses a sound cancellation process to create 'phantom speakers'. Consider sound coming from a left stereo speaker. It arrives at both ears, the short time difference between the left and right ear telling the listener that it comes from the left front. If the right ear is covered, the sound appears to come from the left side. Virtual Dolby Surround creates this effect by using a cancellation signal that's equal and opposite to the right-ear signal, thus cancelling it.

Fig. 7 shows how virtual processing works. The Surround information from a Dolby decoder has first to be isolated: this works with either analogue or digital Dolby systems. Cross-cancellation is next applied to the Surround signals, which are then mixed with the front left and right channel signals.

There is no such thing as a free lunch. In the case of Virtual Dolby Surround, the trade-off is a narrow but deep 'sweet spot' (where the effect is most noticeable). When Dolby demonstrated the system to us we sat in rows, each person sitting behind the other. As one listener commented, "fine if you like watching television while sitting in a canoe"! Dolby used the system with the film Outbreak. The general feeling was that Virtual Dolby Surround offers more than a conventional stereo system but falls well short of the results obtained with a full-blown system.

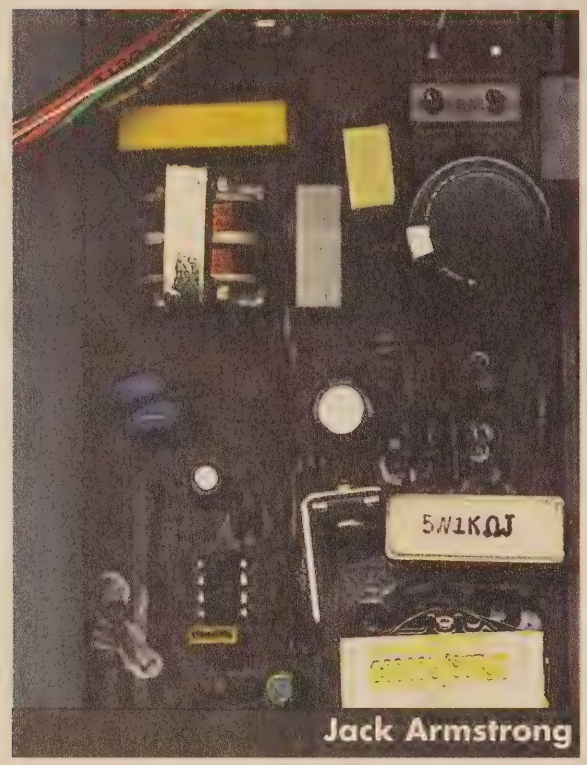
Roger Dressler agreed, but argued that only ten per cent of US homes have a Surround sound decoder, and that systems like Virtual Dolby Surround are a way of introducing more people to surround sound.

A number of chipmakers, including Intel, Matsushita and Texas Instruments, are manufacturing ICs for the system. There was no news about which setmakers will be launching receivers that feature Virtual Dolby Surround however. But one suspects that a fair number will adopt the system.

Acknowledgement

Many thanks to Dolby's UK and US staff for their help in the preparation of this article.

Satellite WORKSHOP



I write this during the lightning season: my workshop has been filled with allegedly 'lightning damaged' receivers, most of which had simply refused to start up after being unplugged from the mains supply for a while. This is usually a because of low-value electrolytics, nothing to do with lightning damage.

The story with one Pace MSS100 receiver was rather different however. It worked perfectly except for the terrestrial TV loop-through, which produced very grainy, colourless pictures. The satellite TV channels were perfect. But the receiver's owner was not satisfied with only 250 channels – he wanted the other five as well!

I had to replace the surface-mounted TDA8725T UHF input amplifier chip U201 (part no. 909 0872501), also the components between its input pin 5 and the UHF aerial socket – R219 (39Ω, part no. 940 3900501) and C227 (10nF, part no. 950 1035621). While I was putting the screws in, I had a phone call from Wossname up Church Street.

"Gorranaarreff mod fur an MSS100?" he enquired.

I explained, as gently as I could, that the MSS100 does not have a separate RF modulator module, but he insisted.

"Course it 'as. Where d'you think you stick the aerial plug, you great oaf?"

At this point I gave up and suggested that he phone CPC or HRS. Let them deal with it! I just hoped that the owner of the MSS100 wouldn't bring it to me after Wossname had "looked at" it.

No Signal

An MSS100 that arrived a few weeks ago had me stumped for a while. "No signal" it announced, on a blue background. Now the cause of this is often a dry-joint at D18 or, occasionally, a broken soldered joint at the tuner unit's input pin. It was neither of these in this case however. In addition the LNB supply was present, so it wasn't a question of going into the menu to see whether some idiot had selected 'LNB power OFF'!

To see what was happening, I turned off the blue screen – by pressing 'F' then store — and found that there was a marked difference between the noise on the screen with the LNB connected and with it disconnected. This suggested that the tuner was probably all right but was stuck on an out-of-band frequency.

The board's design is such that a tuner with serial data control could be used. At present however the receiver still uses analogue voltage control via a divided-down frequency feedback loop. This process is handled by the frequency-synthesiser chip U100, which is an LM7001 as in SS9000 series receivers. The actual tuning voltage is produced by an integrating circuit based on the MOSFET Q100.

A quick voltage check showed that the 30V supply to this circuit was present. But Q100 was permanently off. Before jumping in and replacing Q100, I used the scope to check around U100. This showed that the 5·625MHz crystal X100 was not oscillating. A new crystal restored normal operation.

Pace PRD800

In the heat of the summer a jovial gentleman skipped into the workshop with a Pace PRD800 tucked under his arm.

"Doesn't like the heat, ha, ha, ha" he chuckled. "Keeps scrambling the pictures, ha, ha."

He passed the offending receiver to me, and I almost dropped it as I was so distracted by his attire. He sported nothing more than a pair of shorts, a baseball cap and a beer belly. A horrible sight, made worse by the fact that he was as red as a beetroot.

He chuckled his way through the ticket-completion procedure, then took himself off – to his sun lounger presumably.

I went through the motions of soak testing the receiver but, after six hours, the fault had not shown up and the day was becoming cooler. So I finished off my tenth repair of the day and then phoned the jovial one.

"Ha, ha, ha" he explained. "Does it mostly on QVC. Her indoors doesn't get out much nowadays, so she likes to watch that."

I left the receiver tuned to QVC overnight. Sure enough, next day the picture was scrambled. I disconnected the receiver and let it cool down for an hour before repowering it. There was a picture, but I noticed tiny speckles – not sparklies, which are the tadpole-shaped spots you get with a poor signal, but tiny dots on bright colours. They were present in only the centre two-thirds of the screen. As the receiver warmed up the speckles became worse. Finally, the picture scrambled. The other Sky channels remained perfect for several hours before they, too, became scrambled – one by one!

I won't bore you with the details of how many ICs I swapped and how many curses I uttered. The cause of the problem was eventually traced to link wires J1-J4. These are factory set by cutting certain combinations – a sort of fine tuning for the decoding 'cut and rotate' points. One link had apparently been cut by mistake, and the scrambling was the result.

I phoned the jovial gentleman to tell him the news. He didn't chuckle when I told him the price.

The BT SVS250

This receiver was made by The Orient Power Video Manufacturing Co., which made the Oritron/Aegir/Dixi/Lenco D2-MAC decoder. I had three of them in for repair on the same day.

The complaint with the first one

was "decoder messages disappear after warm up". Replacing the 1µF electrolytic C45, next to the PTV111 chip U6, often cures this fault. On this occasion however the cause was C38, a 33nF polyester capacitor. It measured correctly but must have been leaky.

The second one had had a fault which the dealer described as "patterning". He'd cured it by replacing D15, L6 and C29 at the rear, right-hand corner of the decoder board, using a hairdryer and freezer to find the cause. He then discovered that at switch on the display showed "LNB5", followed by "off". LNB5 is actually LNBS, which means LNB short-circuit. I told him to post it to me, which was why it was now on the bench.

In fact there was no LNB short-circuit, and the LNB voltage was 14V DC under load. I traced the cause of the fault to transistors Q407 (2SC1815) and Q406 (a medium-power pnp type) next to a heatsink. Fortunately I have a poor photocopy of a photocopy of what is laughingly described as "the circuit diagrams" – barely readable, but at least I was able to figure out the LNB supply circuitry (though the cause of the fault was actually in the 12V regulated supply!).

The third SVS250 exhibited symptoms I'd not come across before. When I changed channels I could see only a blank screen for the first couple of seconds, then the picture appeared. With channel 18 (possibly others as well) the screen remained blank (this is the Cartoon Channel). After replacing every electrolytic capacitor on the main board I found that the cause of the fault was C173, a green-coloured 47nF capacitor which is in the middle of a cluster of electrolytics just to the right of the tuner.

As a precaution I also replaced C460 (100µF) next to the heatsink. When faulty it causes a herringbone pattern that customers often describe as "loses colour when warm".

These BT receivers are now dropping like flies. They should be good little earners for a few months.

Pace Receivers

Several people have asked why my articles contain so many references to faults with Pace receivers. "They must be very unreliable" one reader commented. Not so. There are several reasons why I do so much work on Pace receivers. First, far more of them were sold in this area than any other. Secondly, my customers like them so much that they prefer to have them repaired rather than scrap them. Thirdly, parts are readily available for even eight-year old receivers. And fourthly service information is willingly provided by the Pace Technical Department. These factors, together with Pace's openness about any problems, mean that dealer and customer loyalty remain high.

With truly unreliable receivers you'd be reading about the same faults month after month. No one wants to read about replacing start-up resistors time after time after time – which is why I write about Pace receivers instead!

Jack Armstrong is willing to try to sort out readers' satellite TV receiver problems via e-mail. You can reach him via the Internet at:

jack@netcentral.co.uk

One model per message – state make/model and fault symptoms. If you have no e-mail facilities you can write to him c/o Television, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Please enclose two stamped envelopes.

Test Case 417

High summer is a relatively slack time in the workshop. It's also the favourite time for taking holidays however – how service managers would love to abolish holidays! So it was that our occasional stand-in, Roger, came to be installed at a repair bench in the peace of the almost deserted service department. The first few repairs he handled gave him no trouble – a Sony VCR with dirty heads, a Tatung telly with a dodgy mains switch, and a blown-up Pace satellite box for which we had a repair kit in the stores. Roger was in fact rather rusty with regard to diagnosis and repairs, and was relieved to be doing so well. Then the Mitsubishi VCR came along.

It was an HSB12, a straightforward and reasonably trouble-free machine that was about seven years old. The reported symptom was a simple one: the deck would shut down a couple of seconds after any mode (play, record, fast transport) was requested via the front panel or the remote control unit. A belt problem perhaps, or maybe hardened grease on the deck surface. Roger removed the top cover, inserted a cassette and asked the machine to play. It laced up the tape smartly, everything started to move, then the deck went into the stop mode. Roger noticed that before the shut down the drum rotated, the capstan drove the tape and the reels turned.

Maybe, thought Roger, the cause of the problem lay with the reel rotation sensor. This can usually be proved by using the pause key just after the commencement of play. But there was barely time to do so before the deck stopped. An oscilloscope check on the reel-sensor pulses at pin 29 of the main microcontroller chip showed, briefly, that they were present. What was the next most likely culprit? The mode switch of course. There was a good likelihood that during the seven years or so it had become tarnished or worn. It's usually quicker to fit a replacement than try to monitor and interpret the outputs of the original mode switch, especially in a situation like this where mechanical operation continued for only a short period. As there was a new mode switch of the right type in the stores, in it went. But the machine still insisted on shutting down after a couple of seconds, whatever the mode.

Why, Roger wondered, was the microcontroller chip not happy when everything seemed to be up and running? Perhaps it didn't know that the capstan was rotating, even though it was being told that the spools were turning. Another scope check showed that the capstan FG feedback was present at pin 13 of the microcontroller chip. After more headscratching Roger decided to check all relevant voltages from the power supply – they were OK, or at least within tolerance. He then checked the off-tape control-track pulses, which were also fine though hardly relevant to the problem.

As in most VCRs, there's another microcontroller chip on the front panel. Its duties relate to control-key input decoding and fluorescent display-panel drive. The two microcontroller chips talk to each other via serial data lines. Could the one at the front be telling its colleague in the engine room to stop, and if so why? You cannot read, analyse or interpret the whizzing data carried by a serial control/data line, or at least we can't – with or without the help of Roger! Resisting the temptation to order a microcontoller chip – which would have arrived after his stint of duty – Roger finally found the cause of the trouble. It was nowhere near the front panel or the syscon microcontroller chip. What was it? For the solution, turn to page 832.

Servicing in the Digital Age

Eugene Trundle reports from the recent RETRA service conference, which was mainly concerned with the problems that await us when digital TV/video equipment will need repair

The first service conference organised by dealer association RETRA was held early last month in Birmingham. Its main purpose was to consider the future of the consumer electronics servicing and repair industry in the imminent age of digital TV and video equipment.

Key Presentation

RETRA'S president, dealer Chris Keeble, outlined the problems that face engineers and technicians in the beckoning digital era. He portrayed several species: Nigel, 17 years old, with moderately good exam results; Modem Singh, 23 years old, who's passed all his exams and loves computers; Harry (100 Watts) Homer, who earns more at evening pop-music gigs than he does during the day at his repair bench; John, 39 years old, who passed his exams long ago and is getting rusty in spite of his long experience; Jody Fixall, who can fix anything electrical or electronic; and Rodney Radar, 63 years old, who was an RAF apprentice in 1950. Most readers of *Television* will see themselves somewhere in this list of characters.

All, with the exception of Rodney who is cruising towards his retirement and pension, desperately need practical, hands-on retraining and updating to enable them to deal with the new technology. Some are seeking to leave the trade at the first chance, while some are expecting their P45s at any time. A bleak outlook, it seems, typified by John. He declares himself to be in the dark about new technology, demoralised, underpaid, underequipped, lowly in status and having difficulty right now coping with 1,000 new products from 31 manufacturers without a digital receiver as yet amongst them!

Chris Keeble then enacted, with colleagues, a typical scenario. This involved a hilarious exchange of views between a field engineer (puffed out and parked on double yellow lines), a boss (being chased by a customer for a refund unless his repair is completed within twenty minutes), and a bench engineer who had no service manual for the digital widescreen TV in question and no training on it – he didn't know where to start, and guessed that maybe the power supply or the timebase sections might ring some bells, based on previous experience.

The scene was thus set by people who were clearly in there at the sharp end of the industry. The rest of the day was spent exploring possible solutions to the problems – with 'snapshots' presented by representatives of the broadcasters, the setmakers, technical colleges and retailers.

Training and Test Equipment

BBC training manager Andy Woodhouse conceded that the Corporation has more money at its disposal than Midshire TV Repairs Ltd. It nevertheless faces similar problems. He mentioned four pieces of expensive test gear that each provided different answers, then went on to describe digital broadcasting modulation and delivery systems and the way in which the BBC proposes to arrange its own digital terrestrial TV multiplex, with promises of widescreen pictures and, hopefully, a return to the days of on-screen service aids and information for repair and installation technicians.

Setmakers Sony, Pace, Thomson and Panasonic outlined their plans and hopes for service support in the digital age. On the subject of test equipment, Sony admitted that it is impractical for the company to repair digital video products in the UK at present – the test

equipment required is simply too expensive! Products that need repair are returned to a service facility in Belgium.

Sony's UK training budget is probably greater than that of any other UK brown goods manufacturer, reflecting the company's success in the market place. So long as its dealers and service centres are prepared to invest in training and equipment, Sony says that they will be given full back-up, including subsidies for test gear and plant and comprehensive product training.

Questioned as to whether the manufacturers were trying to "squeeze out" the smaller servicing businesses, Sony's Howard Marsh stressed the need for competent service staff and adequate equipment. He added that without the minimum requirements of an on-bench PC and good surface-mount rework stations, service centres will be struck off Sony's approved list for some product types.

Panasonic UK's Simon Nash described the evolutionary nature of consumer goods servicing over the last forty years, and drew contrasting pictures of the service departments of the past, the present (very similar in most cases!) and the future. He foresaw a future with DVD, solid-state memories replacing video tape, service software on floppy discs, CD-ROM service manuals and ICs with ball-grid arrays over their faces for surface contacts.

Panasonic's plans for the future include an Internet site for technical support, the Lucy system to interface with a PC for diagnosis and setting up purposes, and liaison with technical colleges – the company already has Modern Apprenticeship schemes going with Bracknell and Wokingham colleges.

Optimism from Pace

Pace Micro Technology has had most experience to date of manufacturing and servicing digital TV gear. Though currently going through a difficult period, the company presented an optimistic picture. It already had a test program for use with a PC, and expects to have diagnostic software ready for the UK launch of satellite DTV. The company's message to technicians is not to be afraid of the new technology, and to "have a go".

The current Pace DTV receivers incorporate operating software for MPEG signal decoding in two flash memories that can be reprogrammed over the air or via an RS232 PC interface, a 16Mbyte RAM for frame storage and a combined video/audio decoder all on a four-layer PCB. A fast modem is built in to provide a return channel via a telephone line.

Internet Ordering

Cromwell Business Systems described the increasing use of the Web and other advanced communications systems for spares ordering, component search and selection, and technical databases. Manufacturers and service providers are turning to the Internet, generally with the use of confidential passwords. It was envisaged that engineers would have access to this information on the road and on site at customers' homes using a laptop computer. Indeed information is becoming so dense and widespread that search services (datamining) are already being offered by several companies. It's expected that there will be 225 million Internet users by the year 2000, with 200 million of them using e-mail.

Education

Representatives of colleges and examining bodies described the difficulties they face in the further education sector – with accusations of apathy from several quarters hardly helping. Central and local government funding is low and at present has two objectives, maximum class occupancy and helping the unemployed. Courses for the TV/video servicing trade have to be largely self-supporting. They have had poor take up, and are expensive and complex to run. Their cancellation is for these reasons easy to justify – in the relatively few places where they are still run. The equipment and know-how in colleges are out-of-date.

Despite this grim situation Jim Potts, of the Greater Notts Technical College, found reasons for hope. He described partnerships with manufacturers and dealers, and funding from EU sources and from the government, as possibilities. Everyone agreed that no single sector could afford to bear the cost of retraining alone, and that the burden would therefore have to be shared.

Setmakers pledged help with training lecturers and designing relevant courses and syllabuses, also (in some cases) subsidisation or donation of equipment. Thomson Multimedia's representative Mike Geaves however made it clear that the perilously slim profit margins in the industry meant that little of this sort could be afforded.

General Discussion

The day finished with a general discussion of possible sources of training and the all-important funds to finance it. Training could be provided by setmakers, technical colleges, specialist technical training companies, distance-learning courses and the Internet. Work on developing the latter is already being undertaken in various quarters. Possibilites for finance include central and local government, EU funds and (suggested from the audience) a 'levy' imposed by manufacturers; also a 'compulsory' donation of 0·25 per cent of turnover to a common kitty for training and 'upskilling'.

Pointing to the healthier state of the servicing industry on the European mainland, one delegate suggested that certification and a licence to practice, as in France, Germany and also Australasia, would help: this might come to the UK eventually as a result of European law. It was also suggested that broadcasters who subsidise receiver costs (e.g. BSkyB) will offer free servicing or equipment replacement in order to maintain their subscriber base.

A point made was that with sixty million TV receivers currently in use in the UK, and the relatively poor DTV takeup elsewhere in the world, the changes are not going to happen overnight.

It was an interesting conference that provided much food for thought. At its conclusion, there was a strong sense of recognition and awareness of the problems that lie ahead. RETRA hopes to arrange further service conferences and seminars in the future.

RETRA president Chris Keeble talks to delegates.

continued from page 783

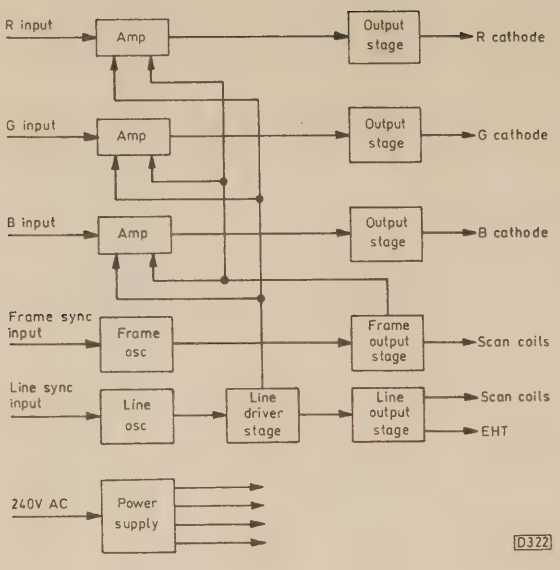


Fig. 1: Basic block diagram of a colour monitor.

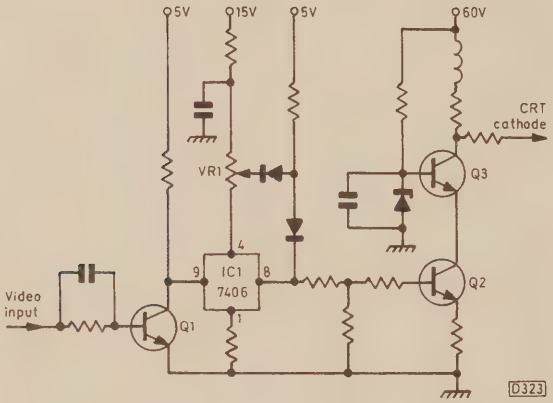


Fig. 2: A typical digital (TTL) video driver circuit.

SVGA monitors, the most common types encountered these days.

Power Supplies

Fig. 1 shows a block diagram of a typical colour monitor. It will look very familiar to anyone reading this article. Most monitors have a chopper power supply that provides outputs at around 6·3V, 12V, 20V, 87V (HT) and 135V. I've come across a few older monitors that have a series-regulator power supply, but these tend to be early types and you probably won't encounter one in normal servicing.

The power supply is normally conventional in design, but mention should be made of power-saving systems. The idea is similar to a TV set that switches itself to standby if the tuner doesn't receive a signal for a given length of time. Unlike a screen saver, which is a piece of software designed to avoid phosphor burn, the power-saving system is built into the monitor, switching it to the standby mode in which it consumes less power. The monitor needs some sort of signal from the PC to let it know when to go into standby. Two systems are in relatively common use.

DPMS

The first is the Display Power Management System (DPMS), which was developed by the Video Electronic Standards Association (VESA). This system has four states: on, standby, suspend and off. DPMS controls the monitor by disabling the sync signals. With line sync missing and frame sync present the monitor goes to standby and remains in this state until it is returned to on (for example if a key on the PC's keyboard is pressed) or it is asked to change to the suspend mode. This is done by restoring the line sync pulses while disabling the frame sync pulses. The monitor uses less power in the suspend than in the standby state.

Nutek System

The second system in relatively common use is the Swedish Nutek system. This has the advantage that it's not necessary to manipulate the signals from the video board in the PC. It is activated by a lack of blue video input, which can be accomplished by using a screen saver that blanks the screen. If there's no blue signal for a given period of time, a Nutek monitor will switch to its first power-saving state, in which it consumes about 80 per cent of its normal power consumption. If the lack of blue continues, the monitor switches to its second power-saving state, which usually means shutting off everything except the CRT's heaters and the microcontroller chip. This second state generally lowers the power consumption to about ten per cent of normal. When the monitor detects a blue signal it returns to its normal operating state (if a screen saver is used to remove the blue signal, this will happen when the mouse is moved or a key is pressed).

Video Drive Circuitry

The video drive circuits used in most analogue colour monitors are basically the same as those used in colour TV sets, so no more need be said about them. Monochrome and digital (TTL) colour monitors are slightly different. They use a digitally-coded signal at each input, sometimes with an additional intensity signal, rather than the analogue input signal used in TV sets and the more modern (analogue) colour monitors. This means that the electron gun is either switched on (when a digital one is present) or off (when a digital zero is present), with no provision for turning the gun on partially. As a result, the number of colours that can be displayed is extremely limited.

Fig. 2 shows a typical digital (TTL) video driver circuit. Q1 at the input amplifies the signal received via the video cable to a level that's suitable to drive IC1. This is a simple logic chip that's used to clean up the incoming signal. VR1 acts as a contrast control, by varying the amplitude of the output from IC1 and thus the difference between light and dark. The output from IC1 is fed to the video output stage, which is based on transistors Q2 and Q3. This amplifies the signal to a level suitable to drive the CRT.

Frame Timebase

An important difference between the frame oscillator used in a TV set and a monitor is that the former is free-running, synchronised by the frame sync pulses. In many monitors however the oscillator generates a single sawtooth waveform each time a frame sync pulse arrives.

Fig. 3 shows a circuit of this type, with an SCS (silicon controlled switch) as the oscillator. When a negative-going frame sync pulse arrives at the gate of the SCS it switches off and the two 0·22µF capacitors charge from the 53V supply to produce a positive-going sawtooth. When this reaches a certain amplitude the SCS switches on again, shorting out the charging capacitors. Feedback from Q1 linearises the sawtooth, with VR1 and VR2

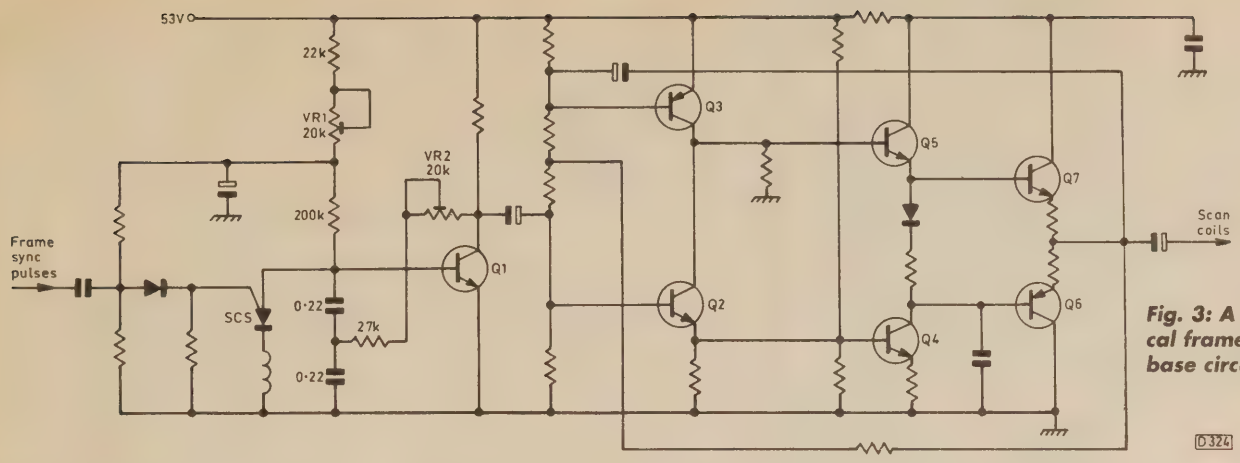


Fig. 3: A typical frame timebase circuit.

providing height and linearity adjustment. The following transistor pairs (Q2/3, Q4/5 and Q6/7) amplify the sawtooth waveform and drive the scan coils. Note that the use of discrete transistors, rather than a power chip, is far more common in monitors than in TV sets.

Line Timebase

As with the frame timebase, the line oscillator in a monitor may run only when line sync pulses are present. With many monitors an internal break in the video lead is a common cause of no line output stage operation and thus no picture.

Apart from the need for sync pulses to be present to fire the oscillator, the line timebase circuitry used in most monitors operates in the same way as that in a colour TV set. It is worth mentioning however that the EHT is frequently higher in a monitor than in a TV set with the same CRT size.

In Conclusion

If you decide to have a go at repairing computer monitors, this article will hopefully help you to avoid some of the traps that can befall anyone who thinks, as I did, that a monitor is simply a TV set with bits missing. While this is largely true, many hours can be wasted with an apparently dead monitor that suddenly springs into life when it's connected to a PC! Nothing can replace a good service manual of course. But a knowledge of what goes on in a monitor and the differences between monitors and TV sets should enable many of the more basic repairs to be carried out despite not having service information to hand. Good luck!

BACK NUMBERS

We have available a limited stock of the following back issues of *Television:*

1994 January, February, March, May, June, July, August, September, October, November and December

1995 January, February, April, May, June, July, August, September and December

1996 January to December inclusive

1997 January, February, March, April, May, June, July and August

Copies are available at £3·00 each including postage. Send orders to:

Reed Business Information,
Television Back Issues,
Room L302, Quadrant House,
The Quadrant,
Sutton,
Surrey SM2 5AS.

Make cheques/postal orders payable to Reed Business Information Ltd.

TELETEST
Test Pattern Generators for TVs & PC Monitors
TELETEST 60 day no quibble money back guarantee! OZAN
MONEY BACK GUARANTEE
Earn extra money repairing PC Monitors
Above: The TELETEST PC for computer monitors.
Right: The TELETEST-2 for TVs and VCRs.
TELETEST-2 & TELETEST PC: £149.95 each
Carry Case & PSU: £9.95 each.
UK P&P £5.95, Overseas £15.95 Prices ex VAT
OZAN: 37 Haviland Rd, Ferndown Ind Est, Wimborne, BH21 7SA. UK
Fax: 01202 877271 (Overseas Tel: +44 1202 877270 Fax: +44 1202 877271)
Web site: http://www.ozan.co.uk
Still essential for Channel 5 retuning problems
OZAN, FREEPOST, Wimborne, BH21 7BR
Freecall: 0500 009070
7am-10pm everyday
FREE info packs. Credit card sales. Technical help.

TV Fault Finding

Reports from
Michael J. Cousins, MIEEIE
Ray Porter
John Edwards
J.S. Ruwala
Philip Blundell, AMIEEIE
Maurice Kerry
Giles Pilbrow
Mike Leach
Mark Corner
Michael Dranfield
Michael Maurice and
David A. Chaplin

Sony KVM1620U

The customer said that there was sometimes a blank screen with no sound. Sony TV sets in particular produce a blanked screen when there is loss of the signal or sync pulses etc. So when the fault finally appeared I selected the tuning mode via the remote control unit. Sure enough tuning drift could be seen.

Where to start? The 33V tuning voltage supply stabiliser was checked and found to be OK. A replacement tuner was then fitted but the fault, which could take a few hours to return, was still present. Eventually the cause was narrowed to the 2SC2712G surface-mounted transistor Q104 (equivalent to the BC846) and the 0·047µF capacitor C148. These components are in the variable tuning voltage supply. **M.J.C.**

Hitachi G8Q Chassis

"No sound or vision" the customer had said. When the setting of the first anode preset was turned up a blank raster appeared. So I jumped to the incorrect conclusion that there was a programming error. I fitted a switch to the remote control chip's pins, but no programming sequence came up on the display. On closer inspection the cause of the fault was found to be a dry-jointed connection to the sleeved wire that links the 8V supply to the text board and the 5V regulator IC001 (supply to the tuner). **M.J.C.**

Alba CTV842

This 14in. portable produced a snowy screen with no sound or picture. Retuning made no difference, and checks at the tuner then revealed that the variable tuning voltage was missing. This led me to transistor Q107, which integrates the tuning voltage. Its 10kΩ collector load resistor R108 was open-circuit.

This set is fitted with the **Nikkai TLG144R** chassis. **M.J.C.**

Sharp DV5105

One of these sets was stuck in standby with the red/green LED flickering. The cause of this was the main microcontroller's reset chip IC1004, which was oscillating. My circuit diagram shows D1005 in the associated circuitry replaced with a link and R1053 as 1kΩ. But the set had D1005 in place and R1053 as a link. Changing these components to correspond with the circuit diagram cured the fault.

While the set was on soak test the 15V supply at C754 drifted. So zener diode D754 (6·2V) was also replaced. **R.P.**

ITT Monoprint BNN Chassis

One of these sets was slow in producing a channel display, sound or a picture from a cold start. It worked normally after the third attempt. The raster, HT etc. all came up quickly when the fault was present.

I decided to check the memory and microcontroller reset circuit (transistors T1405/6 and associated components) carefully. As T1406 had only 0·65V between its base and emitter, it didn't switch on. A replacement transistor made no difference, and the associated resistors were all within tolerance though T1406's emitter resistor R1420 read 85Ω instead of 82Ω.

A few calculations showed that T1406's drive was marginal at best. So the value of its base drive resistor R1427 was reduced from 2·2kΩ to 1·5kΩ. This cured the fault. R1420 had possibly started life at much closer to 82Ω, which would have given T1406 an extra 20mV of drive.

Non-teletext models are likely to be immune from this problem, as the current that flows via R1420 is lower. **R.P.**

Tatung 160 Chassis

The symptom with this 20in. set was line collapse accompanied with smoke. The line scan coupling capacitor C406 (0·39µF, 250V) had split in half. Its value is 0·33µF with 16in. sets. **J.E.**

Mitsubishi CT21M1TX

This set had no audio output. The cause was found on the power supply board, where Q952 (2SA950) was leaky collector-to-emitter. It's the regulator for the 22V supply to the audio output stage. **J.E.**

Sony KV2256 (PE3 Chassis)

Each time it was switched on this set was slightly off tune. Gradually, over a minute or two, it produced a good picture. When the 33V supply at D005 was checked I found that the voltage rose gradually from 26V to 32V. The supply comes from a rectifier circuit that consists of D652, R651 and the 33µF reservoir capacitor C652. Replacing this capacitor cleared the fault. **J.S.R.**

Mitsubishi CT2555

Despite dealing with all the dry-joints on the IF panel there was

still severe patterning. Replacing C920 and C925 cleared the fault. **J.S.R.**

Hitachi NP84CQ Mk 2 Chassis

The R2M overvoltage protection diode ZD953 was short-circuit. So I replaced the STR4211 regulator chip IC901, the 2·7V zener diode ZD910 and ZD953. The set then came to life, but the HT was high at 126V instead of 111V. This was cured by replacing C908 (4·7µF, 160V) in the feedback control loop. **J.S.R.**

Philips 2A Chassis

The problem with one of these sets was that the contrast couldn't be turned down. Although the contrast control voltage at pin 2 of plug M1 (the output from the CITAC module) varied, there was no variation at pin 7 of the TDA3561A colour decoder chip. When diode D6492 (OF449) was lifted to isolate the beam limiter circuit from the contrast control normal operation was restored. D6492 was leaky. **P.B.**

Philips G110 Chassis

If there is a line output stage short that's not caused by a faulty line output transistor or transformer, check the scan coupling/correction capacitor C2550 (390nF) by replacement. I have known this capacitor to go both short- and open-circuit. **P.B.**

Grundig CUC740 Chassis

For intermittent loss of sound, check whether the +G supply goes missing when the fault is present. If so, the cause of the trouble is usually faulty relay contacts. The fault can clear temporarily when the chassis is moved or the relay is tapped. **P.B.**

Philips G90 Chassis

If the set is dead, check for cracks in the print by the line output transistor's heatsink. The track most likely to break is the one that provides the line output stage's 95V supply. To prevent the PCB being strained any more, make sure that the lower back retaining screws are fitted. Otherwise the cabinet can flex when the set is on its stand. **P.B.**

NEI 2041TXS etc

The customer complained about pulling at the top of the picture when he used one of these sets for playback with a GoldStar VCR. The fault can be cured by changing the value of R560 from 220Ω to 100Ω. This resistor is not marked, but can be found at the rear of the set between link K100 and a green delay line. **M.K.**

Hitachi CPT2026 (NP83CQ Chassis)

There was a blank screen with the sound OK. When the setting of the first anode preset was upped a raster with flyback lines appeared. As the setting was then reduced, first a picture appeared then it was lost. We found that someone had fitted a BU508AF line output transistor instead of a BU508DF.

With a BU508AF fitted, line flyback pulses were being fed back to IC701. This upset the field blanking. **M.K.**

GoldStar CF25C22F (PC33J Chassis)

There was excessive width with bowing at the sides. As C413 (10µF, 250V) had obviously been subjected to stress I fitted a replacement. This restored correct width, but the new capacitor very soon overheated and bulged like the original. So I switched off and looked at the circuit diagram again. As a result I removed the scan-correction capacitor C405 and checked it out of circuit. The reading was low at 0·128µF instead of 0·22µF. This was obviously why C413 had failed. With two new capacitors fitted the width and EW correction could be set up correctly, and cramping at the left-hand side of the screen also disappeared. These two capacitors are in the line scan coupling circuit. **M.K.**

Toshiba 1450TB

There was field collapse and the line was short by 1·5in. at each side. I checked the 8V supply at the output of IC480 (MC7809BT) and found it low at 3·9V. This supply feeds the multi-purpose chip IC501, which amongst other things provides the field and line drives. The set worked normally when a new MC7809BT IC had been fitted. **M.K.**

Sharp DV3760H

There was no output from the power supply because the 1N4997 HT rectifier diode D601 was leaky. The part no. is DX0515BM. **G.P.**

Hitachi C2564TN (G10Q Chassis)

The standby LED was pulsing and a check on the standby supply showed that it varied with each flash. The cause of the trouble was the CNX82 optocoupler OPTO1, part no. T548009, which relays the power on/off command to the isolated side of the power supply. The LED in OPTO1 was open-circuit. **G.P.**

Panasonic Euro 1 Chassis

This set worked happily enough in the AV mode, but when an attempt was made to select an off-air channel it would shut down then come back on again with a display of snow. The MSP2410-08 multi-sound processor chip IC1401 turned out to be the culprit, although the voltages around it and the data lines all seemed to be OK. **G.P.**

Sony KV2705UB (QE1 Chassis)

The 135V HT supply was found to be low at only 80V, and a scope check showed that there was considerable ripple across the HT reservoir cpacitor C652 (33µF, 250V). A new capacitor cleared the fault. **G.P.**

Panasonic Euro 1 Chassis

This set continually started up then shut down because the line drive was being switched on and off by the microcontroller chip. Voltage checks at the various digital ICs showed that the reset line to some of them was low at around 3·8V instead of 5V. The MSP2410-08 multi-sound processor chip IC1401 was pulling its reset input (pin 10) low. Replacing IC1401 cured the fault. **G.P.**

Ferguson ICC6 Chassis

The picture was being blanked out intermittently because the fast-blanking pin of IV01 was going high. The cause of the fault was traced to the BC858B surface-mounted transistor TV92. **G.P.**

Matsui 1436

There were no signs of life with this set. I found that the standby transformer T650 had an open-circuit winding. Its part no. is 558400601. **G.P.**

Hitachi C2118T

These sets were originally covered in my article in the June 1994 issue of *Television*. Here are two further faults that are worth putting on record. If the HT rises after the set has been on for a few minutes, the set then reverting to standby, it's worth replacing C906 (4·7µF, 250V). The 39kΩ resistor previously mentioned (R909) is the usual culprit, but this capacitor has start-

ed to produce similar symptoms.

If intermittent field bounce is causing a bit of a headache and the MC7809 9V regulator (IC703) has been checked for dry-joints, replace it. This device does get rather hot and suffers as the months go by. **M.L.**

Hitachi C2864TNZ

Slow or no start-up from cold can be caused by C909 in the power supply. It's a 470µF capacitor rated at 25V, and is mounted very close to R902 and R902A. These two parallel-connected, 33kΩ resistors get quite hot, damaging C909. Its replacement will usually cure a no start-up problem. **M.L.**

Ferguson ICC8 Chassis

The set was stuck on ch. 02 with a snowy raster. A new microcontroller chip and 8MHz crystal were tried but this made no difference. As checks in the microcontroller circuit suggested that everything was OK, attention was turned to the text board. After unloading IV02's SCL and SDA lines a picture came up. A new SDA5243 chip restored normal operation. **M.C.**

Akai CT2585 (Nokia 2BF 110NN Chassis)

One of these sets caused us some concern. It first came in dead with a faulty line output transistor and loads of dry-joints which we assumed were the cause of the transistor's failure. We fitted a new transistor, dealt with the dry-joints, gave the set a short test then returned it. Next day it was back again with the same fault.

After fitting another transistor we ran the set for a while. It then started to produce an arcing noise with interference on the picture. It seemed likely that the line output transformer was arcing internally. Wrong! A lot of time was wasted, then our luck changed – an identical set came in because of a width problem (more dry-joints).

We were now able to swap components to see if the fault could be transferred from the first set to the second one. This eventually proved that the BC337-25 line driver transistor T507 was the cause of the trouble. **M.Dr.**

Grundig CUC70 Chassis

The power supply in one of these sets had failed, with a short-circuit BU208A chopper transistor. As a precaution, in addition to fitting a new transistor we replaced R646 (270kΩ), the TDA4600 chopper control chip, C631 (100µF), C633 (220µF) and C647 (1µF).

At switch-on the power supply blew up. Extensive checks failed to reveal any problem on the primary side of the power supply, but we found that R661 (0·15Ω safety) on the secondary side was open-circuit. There are only two outputs on the secondary side, 18V and 152V. With R661 open-circuit there's no 18V supply and relay 651 cannot operate. As a result there is no HT supply to the line output stage, leaving the power supply with no load whatsoever. Switch-mode circuits don't like this situation: the result is instant destruction at switch-on. **M.Dr.**

Panasonic TC1631 (U4 Chassis)

The customer's complaint was "no sound". On testing the set we found that there was another fault. When the search button was pressed the sweep would search up the band, but when a station was found the search failed to stop. The two faults were quickly linked: Q1212 on the tuning panel was turned fully on, muting the sound – this is the interstation mute transistor. It receives its bias from Q1217, which turned out to be OK.

There's no circuit description in the manual, but we figured that when the voltage at pin 12 of connector M6 goes high the sweep should stop and the sound mute should be released. This voltage did rise when a station was found, but the sweep didn't stop. The stop signal is generated by Q502/3/4 on the main PCB. When the base of Q504 was shorted to chassis the fault cleared. The three transistors were OK, the cause of the trouble being the associated 10µF, 16V capacitor C513 which had gone very low in value.

A new capacitor restored the sound and the tuning, but we then found that the sound was at maximum and couldn't be turned down. When the up/down keys were used, the analogue output at pin 14 of the SN76730N sound up/down decoder chip IC1203 failed to vary. So it seemed that this IC was faulty. Quite by accident we found that pin 15 could be used to control the volume, the only difference being that volume control worked in reverse – the down key increased the volume while the up key decreased it.

As the SN76730N seems to be obsolete we put it to the customer that we could repair his set but the volume controls would work in reverse. When he agreed to this we swapped over the connections to pins 14 and 15. It was also necessary to add a 100Ω resistor across R1261 to centralise the volume control range. **M.Dr.**

Ferguson TX85 Chassis

If the TIPL791A chopper transistor TR6 is short-circuit, check R101 (1·2kΩ, 5W) in the snubber network. You will usually find that it has gone open-circuit. Replace these items and also R102 (1·2Ω WW), R88 (1·8Ω WW) and IC4 (TEA2018A). Check D8, D10 and D23 (all type 1N4001) and R95 (100Ω).

One nasty point with this chassis is the use of live heatsinks for the chopper and line output transistors. **M.Dr.**

Sanyo CBP2180 (A5 Chassis)

This set suffered from field foldover at the top of the screen. The cause was a dry-jointed chassis connection at the 12V regulator IC552. **M.M.**

Mitsubishi CT2532TX (Euro 4 Chassis)

One of these sets wouldn't store the tuning. A check on the M58630P memory chip IC702 showed that its –31V supply was missing at pin 2. This comes from the sub power supply, where pin 4 of the chopper transformer was open-circuit. Fortunately the break was at the connecting pin and could be repaired. **M.M.**

Ferguson TX100 Chassis

"Gone off with a bang, and a smell of burning" said the voice on the phone. A visual inspection revealed that the HT smoothing capacitor C129 (100µF) had exploded. A replacement restored normal operation. **M.M.**

Mitsubishi CT25A2STX

One of these sets suffered from intermittent loss of the luminance signal. At first it seemed that a dry-joint was likely to be the cause, but the culprit was actually Q202 (J501). **M.M.**

Sony KVA2512U (AE1C Chassis)

Intermittent loss of colour was the problem with one of these sets. We are familiar with the fault on earlier models, but this chassis uses a digital comb filter on a highly complex board. Fortunately the decoder section is in analogue form. There are

two crystals, two trimmers and a surface-mounted J-legged TDA4650 chip here. Replacing these five items and setting up provided a complete cure. **M.M.**

Ferguson ICC7 Chassis

This set came to me from another dealer. It had two faults. He had replaced the mains switch, but said that the set still wouldn't start every time. The replacement switch was faulty: another one put this right.

The second fault was also intermittent. The picture and sound would both go, leaving odd black and white dots and lines on the screen. When the fault was present, I found that flexing the PCB in the area of the tuner made the fault come and go. As there were no dry-joints on the main board the tuner and IF modules were removed and dismantled. The tuner seemed to be OK, but the IF module had a single coil with two of its pins dry-jointed. **M.M.**

NEI 2131TX (Indiana 100 Chassis)

The customer complained of a flash, a puff of smoke and a dead set. On inspection I found that the line output transistor Q600 was short-circuit while the line scan coupling/correction capacitor C604 was dry-jointed at one end. Because of the dry-joint, C609 (1µF, 160V) had exploded, D604 (BA157) had gone short-circuit and R609 (10kΩ) had burnt up. These components form a network in parallel with C604. Replacing all these items restored normal operation. **M.M.**

Samsung C1212R

This set was a catalogue return and had done the rounds before it arrived on my bench. The problem was failure to start, because there was no start-up output at pin 8 of the TMP47C433AN3842 microcontroller chip IC105. As its 5V supply was spot on and there was a normal waveform across the 4MHz crystal I obtained and fitted a replacement chip.

Result – nothing! The start-up signal now reached the power supply, but it still refused to start. While I was checking around the power supply and the line output stage I noticed that the line output transformer's internal windings and connections differed from those in the circuit diagram. The transformer was a perfect fit, and the soldering looked to be original. As I could find no other reason for the failure to start I obtained a new transformer. When I checked its connections they agreed with the diagram. Everything worked when it was fitted. **D.A.C.**

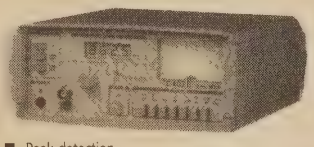
Philips G110 Chassis

There was sound but no picture, just a blank raster. The 200V supply smoothing resistor R3375 (180Ω) on the tube base panel was open-circuit because the TEA5101A/P RGB output chip IC7465 was faulty. **D.A.C.**

Ferguson TX85 Chassis

As the setting of the contrast control was turned up towards the normal level it produced the effect of progressive picture overloading. At the maximum setting the picture was overlaid with black horizontal bars and there was also an audio buzz. After some time I found that there was a break in an earthing print track, where it leaves the customer controls adjacent to the colour control. **D.A.C.**

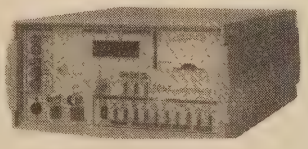
Sole UK Agents for SADELTA



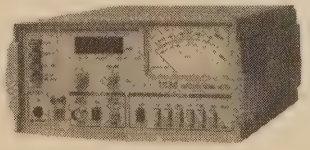
TC-402D
Due to its weight and size, the TC-402D is the ideal instrument for the installation of FM and Terrestrial TV antenna, as well as CATV systems.

- Peak detection
- Built-in loudspeaker for AM and FM reception
- Frequency Indication with 4 digit LCD Display
- Multi-turn potentiometer to enable tuning
- Weight including batteries: 1.9 Kg

TC-90
Portable equipment, with many applications, designed to carry out any type of Terrestrial TV, FM Radio, CATV and Satellite TV. installations.



- Frequency Sweep on Satellite
- Peak Detection
- Measurement of terrestrial TV from 20u V to 3V without the need of external attenuators.
- Rechargeable 12V / 2.6 Ah Battery
- Weight including batteries: 3.5 Kg



TC-80
The TC-80 has been designed for the reception of TV Satellite systems, the installation and testing of domestic and SMATV systems.

- Full Band Frequency Sweep
- Switchable 14V or 18V LNC Power Supply
- Rechargeable 12V / 2.6 Ah Battery
- Weight including batteries: 3.3 Kg.

Available from most wholesale distributors across the UK or direct from

COASTAL AERIAL SUPPLIES

Unit X2, Rudford Industrial Estate, Ford, Arundel BN18 0BD
Telephone: 01903 723726 Fax: 01903 725322 Mobile: 0976 241505

? **PARTS UNAVAILABLE** ?

? **TOO EXPENSIVE** ?

SECOND HAND PARTS
FOR VCR

(Complete boards, head motors, loading motors, capstan motors, mechanisms, panels, etc.)

CALL/FAX
01349 884804
EASI-SPARES
(at RADCOM UK)
10 Averon Road Alness IV17 0PT

Payment by cheque with order (no credit cards) to RADCOM; prices on application plus p&p for all orders.

See us on
http://www.angelfire.com/az/radcom/index.html
Email on user@wardrop.dial.netmedia.co.uk

What a Life!

Don sees a man cry for the first time and recalls some lighter moments since his last column

I was talking to John Stacey, who is about my vintage, the other day. He has been self-employed down Devon way for more years than he cares to recall. Like me, he came into the trade when the only TV was BBC in monochrome. He had some interesting tales to tell.

John recalled going out to demonstrate an electric shaver to a farmer. The farmer took his time trying it, then said "I've a good mind to buy it but, tell me, will it do my toenails without any trouble?"

On another occasion he showed up at a caravan to repair a set, with a mate. They had to wait outside the door while its owner, a young lady, got dressed. When she finally let them in she apologised and added that she often watched TV while undressed.

"I hope they can't see me at the BBC" she said, "they *can't*, can they?"

"Well, it's not something we put about" his mate replied, "because it's a trade secret. But, yes, they can."

Things can go wrong for all of us of course. I recall an occasion when, towards the end of an evening spent making deliveries, my mate Algey and I decided to pop into the Magpie for a drink. There was just one set left to deliver, a 14in. ITT portable. Its plastic cabinet had a moulded handle.

The house we took it to was fronted by a lawn. This had a path with a row of fenceposts and an ornamental chain leading to the front door. Algey, refreshed by his pint, found a burst of energy. He jumped out of the van with the set, ran up the path, and jabbed his thumb on the bellpush. As he did so, he brought the set up ready to hand it over. It hit the nearest post of course, and when the customer opened the door he found Algey holding a neatly severed plastic handle. The rest of the set was on his front step.

The man's face produced a show I shall never forget. It displayed a sequence of just about every conceivable expression from a smile of greeting to one of sheer disbelief. Algey's plight was also something to behold.

Algey delivers an ITT portable's handle . . .

Cash and Carry

In later years I discouraged house calls in favour of providing a cash and carry service. This led to the discovery that about two thirds of my customers had bad backs. Those who didn't had no idea how to carry a set – with the tube's face towards your chest – and because I grew tired of their antics I usually took the set from our rack and carried it to the waiting car.

One day a young pap called in, paid for his repaired set then started to prance around it, wondering where to start.

"Don't worry" I said, "I'll carry it out for you – I've done it often enough." I hoisted the set, lifted it up against my chest and sped off towards the door. As I reached it, the set's mains lead caught on the door handle, yanking the set from my hold. It landed with quite a crunch.

I've never seen a man cry before, and felt about an inch high.

There was a fortunate end to this story. The damage was confined to the cabinet, and another of my customers was a professional french-polisher. He made it look like new, for just £3, all in a day. But it cost me a lot in extra work. I had to strip everything out of the cabinet, including the tube, then fit it all back again.

The customer, who scrutinised the set in vain for signs of damage, made a complete recovery!

Miss Drudge – 2

One of our customers is a formidable old woman who lives in a chair in front of her TV set. This is permanently on, so that she can resume her viewing whenever she wakes from her doze. The other day we had another call from her ageing daughter Miss Drudge.

"Mother's set is playing up again, Mr Bullock" she said flatly. "Can you come as quickly as possible?"

Because I felt sorry for her, I called round right away. The old woman, now well into her eighties, was sitting as usual with her shawl

over her legs, looking at the screen.

The set, a Ferguson 22D1 (TX100 chassis), had a picture. But its geometry was awful. There was too much width, EW distortion and a band of line frilling. When either the width control RV72 or the pincushion control RV71 was moved the band of frilling would shift up and down the screen – in addition to affecting the width and EW correction slightly.

"Tell him I can't watch that" the old woman said.

"Mr Bullock knows you can't watch it, Mother" the daughter replied. "That's why he's here." She looked utterly worn out.

I had to take the set back to the workshop where son Paul, who now works with Steven, tackled it. He found that he could remove the frilling completely. But the set's line linearity then became terrible. After a good deal of checking he found the cause of the trouble. R143, the 6·8Ω safety resistor in the feed to the line driver stage, had risen in value to some 330Ω. A new resistor plus setting up produced a good picture.

When I took the set back and connected it up the scowl left the old woman's face.

"Tell Mr Bullock I'm very pleased" she told her daughter.

"Mother is very pleased, Mr Bullock" Miss Drudge said flatly. "Now I must pay you."

As I left I reflected on the hopeless life Miss Drudge led.

Mitsubishis

Esse Phipps drew up outside in a huge Mitsubishi car. She got us to collect her TV set from it. This wasn't easy – it was a 25in. Mitsubishi colour set, Model CT2534 (Euro 4 chassis).

"Dratted thing won't go" she said in her cut-glass voice. "Too bad, what?"

The set was stuck in standby. After some routine checks we found that the cause of the trouble was in the line output stage. The 2SD1877 line output transistor Q552 tested perfectly, which led us to the transformer (T553). When we took it out we found that pins 1, 2, 6 and 7 were all shorted together, linking the HT supply to chassis.

We ordered a new transformer from SEME, at a very reasonable price. It arrived by return. But when we fitted it the fault was still present.

We spent a good deal of time searching for a further short. Eventually, as there was nothing else left to check, we tested the line output transistor again. It was dead short! A replacement restored normal operation.

When Esse returned to collect it she said that she would be bringing her Mitsubishi VCR in for service. "I'd have everything Mitsubishi if I could" she trilled. "I'm going to buy a speedboat soon. Is there a Mitsubishi one?"

"Sure to be" I said.

"I've been thinking" Steven said afterwards. "I've had that fault sequence before with this chassis. The transistor tests OK then, after replacing a faulty transformer, the transistor is found to be dead short. We'd better replace both items together next time."

Fidelity ZX3000 Chassis

"Time we saw the back of this one" said Steven, hauling a Fidelity CTM2000T (ZX3000 chassis) on to the bench. No vision, sound or channel display was the complaint.

Some quick checks showed that the 12V supply was missing. We discovered a bad dry-joint at the MC7812 regulator, which is mounted on a heatsink close to the line output transformer. This wasn't clear initially, because the regulator is hidden by the infuriating plastic cradle in which the panel sits.

A NordMende Portable

Hazel Nutt is one of those modern girls – big, tall, fit looking and outgoing.

"It's this telly" she announced. "It's got a permanent wave. Ha ha ha!" She shuffled and leant over on her long legs, like a demented wicket-keeper.

The set was horrible too. An old NordMende colour portable, Model 1534 (F10 chassis). We gave the HT circuitry the once-over and found a dry-joint at the negative side of the HT bridge rectifier's 470µF, 160V reservoir capacitor CP11. Resoldering this joint clear-ed the fault.

When Hazel returned to collect the set she was dressed for hockey and was carrying a stick thing.

"Do you play hocky much, Mr Bullock?" she asked.

"Never seem to get the time, unfortunately" I replied, stepping back a bit. "But I think Steven and Paul do, er, don't you lads?"

But they had disappeared.

The Pop Hopeful

Our final visitor that day was Seth Mutt, who aims to be a pop singer as soon as his IQ rockets to 25. He carries a guitar everywhere, but has yet to discover how to play it. He humped in a huge, 26in. Loewe Contour S124 colour receiver (C8500 chassis).

"When I swishes 'im on, like, the lickol light 'd come on, then 'e'd go out" he said. "Har, har, har. Auhhh."

Steven backed off. Being of sterner stuff, I booked the set in and waved him out.

"We'd better look at this set together" I said to Steven when he finally poked his face around the workshop door. "Help me on to the bench with it, will you. We'll put it on your side, shall we?"

I handed him a screwdriver to get the back off. "I could do with a cup of tea" I said, "couldn't you?" When he nodded I skipped off to make it.

When I returned with the tea Steven was working around the TDA4600 chopper control chip. "Its supply at pin 9 is varying" he said.

"Find out why" I suggested, ever helpful. Before long he took out the relevant reservoir capacitor, C626 (100µF, 25), and gave it to me to test.

"Varies as you watch the meter" I said. Between 15-30µF. Guess it's faulty.

He shot me a sideways look and fitted the replacement I handed him. When he switched the set on there was EHT but no brightness or sound. "I'll up the first anode voltage" he said, "without bothering to mark the preset's position." I saw the look of perversity in his face. Bit like Greeneyes, I thought. As expected, there was field collapse.

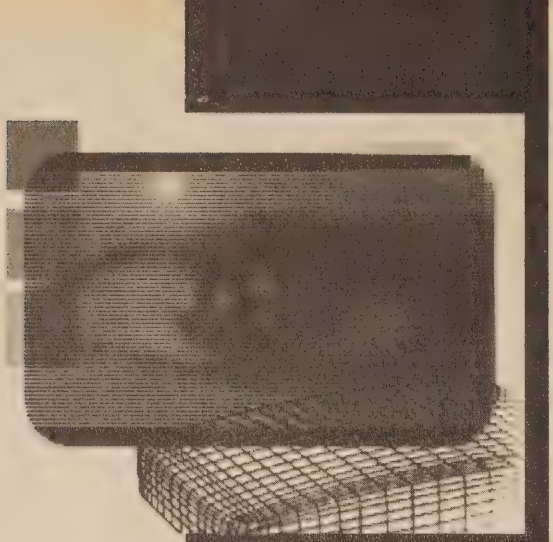
"No sound, no field scanning" I said, mainly to display my powers of observation. "Must be a common cause."

He carried out some checks around the TDA1872A field timebase chip I561 and soon found that the 12V supply was missing. When he traced the source of this he came to the LM7812 regulator chip I553. There was an input here but no output.

I handed him a replacement. When he'd fitted this there was sound and field scanning. After adjusting the first anode supply preset, which I'd hoped would give him trouble, there was a good picture.

"That was an intensive bit of work, wasn't it?" I commented. "I'd like another cup of tea. How about you?"

He looked at my empty mug, then at his own. "Haven't touched mine yet. Don't seem to have had time."



Monitors

Reports from
I. Field
Owen Green
John Edwards
Chris Watton and
Adrian Spriddell

VAN E1428NC

There were ragged verticals and a sort of whingeing noise came from the power supply. As the UC3842 control chip in the chopper circuit receives its supply, also feedback for regulation purposes, from the transformer it seemed logical to suspect the electrolytic capacitors used in this circuitry. These are C509 (47µF, 50V) and C512 (100µF, 25V). C509 looked OK visually, but when given a whiff of freezer its capacitance vanished. C512 was fine but we replaced it anyway. They are both 105°C types. When we powered up however the fault was little changed. A replacement mains rectifier reservoir capacitor completed the repair. It's C506 (150µF, 400V).

I suspect that had we replaced C506 only we would have ended up with a power supply rebuild. **I.F.**

Philips 1565D

No contrast was the complaint. In fact the contrast control worked all right but the brightness was flat out, with flyback lines and the control having no effect. R737 (150kΩ) at the lower end of the brightness control network was open-circuit. **I.F.**

Tatung TM4401

The cause of no display was a faulty EW pincushion correction circuit. We found that TR416 (2SB1375/2SB1015), TR415 (2SC2229) and TR412 (2SD2125/2SC2893A) had all failed. Should you get this fault, make sure that you replace coil L401 or the same thing will probably happen again. **O.G.**

Mitac 1766PD

When this monitor was switched on with no signal input from the PC it remained in the standby mode, as normal, with the amber standby LED glowing. When signals were applied via the 15-pin D connector the monitor ticked quietly, like a clock, instead of coming to life. A check in the line output stage showed that the BU2025DF transistor was short-circuit.

It is easiest to replace the transistor by unsoldering its legs from the PCB then removing the two screws that secure its heatsink to the chassis and the transformer. The heatsink can then be lifted out with the transistor still attached to it. In this case the transistor's heatsink securing bolt was loose. It thus provided poor thermal conductivity.

As we couldn't find any other problems we fitted a new transistor – with a generous amount of heatsink compound. After doing this and applying an input signal the monitor worked correctly: the amber standby LED went out and the green OK LED switched on. **J.E.**

Model 72G9140

I have repaired a number of these monitors but still don't know who made them – only the model number is printed on the back.

This one was dead. Its power supply refused to get going because one of the two 32kΩ start-up resistors was open-circuit. They are easy to recognise, being the large stand-off resistors mounted near the chopper transformer. Renew them both. **J.E.**

Tatung TM3401

This monitor was brought in because it was thought to be dead. It worked all right with our test computer, and went off when the signal input cable was disconnected. This is standard practice – these monitors have shutdown control from the PC. It works by switching off the supply to the line driver transistor.

The switching circuit is mounted on a small PCB near the line output transformer. In this case the cause of the fault was incorrect settings in the computer's BIOS (Basic Input/Output System). **C.W.**

Dell VC2E

The customer's complaint was "low height in Windows, OK in DOS". On checking we found that the reduced height was caused by the refresh rate being used for Windows. One of the height skeleton presets along the back of the motherboard had disintegrated. We replaced VR400, VR401 and VR404 with more substantial presets. **A.S.**

Tatung TM3401

The cause of lack of width and EW correction was traced to a high-resistance 33µH RF choke in the line timebase. It had apparently been added to the circuit as an afterthought, as there was no component reference number. **A.S.**

Peacock 17PRO

If the power supply is smoking, replace the burnt out filter capacitor X2 and connector M603 which goes with it. While you are about it, check and resolder the Molex pins at M608. New connectors are available from Farnell or RS. **A.S.**

Dell VC2E

When this monitor had warmed up its picture wobbled. It also made a vibrating noise. We traced the cause to one or possibly two inductors in the power supply and line timebase circuits. So all suspicious-looking wound components were 'locked' with Resin-W adhesive, our favourite compond for this purpose – it's non-flammable, and might even meet the CE mark criteria. **A.S.**

GRANDATA LTD

Distributors of Electronic Components

TRANSISTORS/LINEAR ICs

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
BC107	8p	BD434	30p	BU126	65p	BUV48AF	325p	MJ4502	300p
BC108	8p	BD435	31p	BU128	125p	BUV48C	250p	MJ10012	300p
BC109	8p	BD436	30p	BU133	125p	BUV50	425p	MJ11015	250p
BC109C	10p	BD437	28p	BU137	150p	BUV61	1000p	MJ11016	300p
BC140	20p	BD438	36p	BU180	100p	BUV70	200p	MJ11032	800p
BC142	20p	BD439	40p	BU184	100p	BUV90	175p	MJ11033	800p
BC143	20p	BD440	65p	BU193	375p	MJ13003	250p	MJ15003	700p
BC147	8p	BD441	40p	BU205	70p	BUW11A	200p	MJ15004	300p
BC149	8p	BD533	50p	BU206	100p	BUW11AF	225p	MJ15015	250p
BC159	8p	BD534	38p	BU207	150p	BUW12	125p	MJ15016	350p
BC160	30p	BD535	38p	BU208	70p	BUW12A	150p	MJ15022	250p
BC171	10p	BD536	38p	BU208A	75p	BUW12F	250p	MJ15023	400p
BC172	10p	BD537	40p	BU208AT	200p	BUW13A	200p	MJ15024	400p
BC177	14p	BD538	40p	BU208B	200p	BUW32A	500p	MJ15025	700p
BC178	14p	BD643	50p	BU208D	130p	BUW48	550p	MJE340	25p
BC179	14p	BD645	50p	BU209	90p	BUW49	550p	MJE350	80p
BC182	7p	BD647	50p	BU225	120p	BUW50	400p	MJE520	30p
BC182L	7p	BD649	50p	BU226	120p	BUW81A	150p	MJE2955T	65p
BC183	7p	BD675	40p	BU312	90p	BUW84	75p	MJE3055T	65p
BC183L	7p	BD676	40p	BU325	55p	BUW85	85p	MJE13004	100p
BC184	7p	BD677	38p	BU326A	75p	BUX10	150p	MJE13005	80p
BC184L	7p	BD678	40p	BU406	60p	BUX11	200p	MJE13007	100p
BC212	7p	BD679	40p	BU406D	85p	BUX12	150p	MJE13009	100p
BC212L	7p	BD680	40p	BU407	55p	BUX20	350p	MJE15028	200p
BC213	7p	BD681	45p	BU407D	75p	BUX21	450p	MJE15029	200p
BC213L	7p	BD682	45p	BU408	60p	BUX22	450p	MJE15030	250p
BC214	7p	BD705	50p	BU408D	75p	BUX23	900p	MJE15031	400p
BC214L	7p	BD707	50p	BU409	85p	BUX37	220p	MJE18004	125p
BC237	7p	BD709	50p	BU412	175p	BUX39	450p	MJF18004	175p
BC238	7p	BD711	50p	BU413	175p	BUX40	210p	MJF18204	350p
BC239	7p	BD736	50p	BU414B	250p	BUX41	200p	OC28	350p
BC300	20p	BD826	50p	BU415A	170p	BUX42	200p	OC29	250p
BC301	20p	BD828	50p	BU426A	70p	BUX47A	220p	OC35	350p
BC302	20p	BD839	55p	BU433	120p	BUX48A	150p	OC36	250p
BC303	20p	BD897	50p	BU500	100p	BUX55	800p	S2000A3	175p
BC304	25p	BD899	50p	BU500D	225p	BUX80	180p	S2000AF	130p
BC327	7p	BD977	50p	BU505	90p	BUX81	160p	S2055A	175p
BC328	7p	BDX33	60p	BU505D	90p	BUX84	50p	S2055AF	175p
BC337	7p	BDX37	100p	BU505DF	90p	BUX85	50p	S2530A	100p
BC338	7p	BDX44	100p	BU506	100p	BUX86	30p	TIP29	15p
BC441	28p	BDX47	60p	BU506D	70p	BUX87	50p	TIP29A	22p
BC446	8p	BDX54C	75p	BU506DF	100p	BUX98A	350p	TIP29C	25p
BC477	18p	BDX62C	150p	BU508A	70p	BUZ71	75p	TIP29E	40p
BC516	22p	BDX63C	175p	BU508AF	95p	BUZ71AF	100p	TIP30	25p
BC537	25p	BDX64C	175p	BU508APH	80p	BUZ72A	100p	TIP30C	25p
BC546	8p	BDX65	80p	BU508D	75p	BUZ72AF	100p	TIP31A	22p
BC547	8p	BDX66C	175p	BU508DF	85p	BUZ73A	150p	TIP31C	27p
BC548	8p	BDX67C	275p	BU508DR	130p	BUZ73AF	60p	TIP32	24p
BC549	8p	BDX71	70p	BU508V	110p	BUZ76A	110p	TIP32A	21p
BC550	8p	BDX77	175p	BU508VF	100p	BUZ80	135p	TIP32C	28p
BC556	8p	BDX87C	175p	BU526	75p	BUZ80AF	200p	TIP33	50p
BC557	8p	BDX88C	150p	BU536	100p	BUZ90A	200p	TIP33C	60p
BC558	8p	BDW24	55p	BU546	125p	BUZ90AF	180p	TIP34	65p
BC559	8p	BDW93	50p	BU603	125p	BUZ91A	260p	TIP34C	60p
BC560	8p	BDW94	50p	BU606D	225p	BY448	20p	TIP35C	65p
BC637	20p	BDY29	225p	BU608D	120p	BYT11	25p	TIP36C	65p
BC639	20p	BDY56	225p	BU626	120p	IRF120	225p	TIP41A	20p
BC640	20p	BDY58	500p	BU705	130p	IRF130	475p	TIP41C	22p
BCY33	200p	BDY60	125p	BU706DF	175p	IRF140	550p	TIP42A	20p
BCY34	200p	BDY92	100p	BU706F	150p	IRF230	550p	TIP42C	22p
BCY70	16p	BF137	35p	BU724A	100p	IRF240	425p	TIP47	40p
BCY71	16p	BF167	30p	BU801	70p	IRF250	375p	TIP48	40p
BCY72	16p	BF181	18p	BU806	70p	IRF330	600p	TIP50	60p
BD115	30p	BF183	20p	BU807	60p	IRF340	325p	TIP51	80p
BD124P	50p	BF195	7p	BU807F	75p	IRF350	750p	TIP52	80p
BD131	25p	BF199	8p	BU808DF	210p	IRF450	650p	TIP54	85p
BD132	25p	BF200	16p	BU810	110p	IRF510	150p	TIP102	70p
BD133	50p	BF225	30p	BU824	450p	IRF520	150p	TIP105	65p
BD135	20p	BF240	16p	BU826	120p	IRF530	150p	TIP106	65p
BD136	20p	BF245	25p	BU826A	160p	IRF540	200p	TIP107	65p
BD137	20p	BF254	15p	BU902	110p	IRF610	150p	TIP110	40p
BD138	20p	BF255	12p	BU903	110p	IRF611	150p	TIP111	40p
BD139	20p	BF256	18p	BU910	80p	IRF620	160p	TIP112	35p
BD140	20p	BF257	18p	BU912	100p	IRF630	150p	TIP112H	50p
BD144	90p	BF259	18p	BU920	100p	IRF640	350p	TIP115	30p
BD157	38p	BF262	25p	BU922	110p	IRF642	200p	TIP116	30p
BD166	30p	BF270	18p	BU930	130p	IRF650	200p	TIP117	30p
BD175	30p	BF273	15p	BU932	175p	IRF710	150p	TIP120	37p
BD177	30p	BF311	21p	BU941	250p	IRF720	150p	TIP121	35p
BD179	32p	BF336	20p	BU2508A	100p	IRF730	150p	TIP122	30p
BD181	45p	BF337	20p	BU2508AF	110p	IRF740	150p	TIP125	30p
BD182	60p	BF338	20p	BU2508D	130p	IRF820	150p	TIP126	40p
BD184	60p	BF362	30p	BU2508DF	120p	IRF830	160p	TIP127	35p
BD187	30p	BF367	13p	BU2520AF	170p	IRF840	150p	TIP130	30p
BD201	33p	BF371	17p	BU2520DF	225p	IRF9140	1000p	TIP131	30p
BD202	38p	BF421	18p	BU2525A	325p	IRF9510	150p	TIP132	30p
BD203	42p	BF422	21p	BU2525AF	220p	IRF9511	150p	TIP136	40p
BD204	42p	BF423	25p	BU2527AF	400p	IRF9520	150p	TIP137	65p
BD222	31p	BF455	12p	BU2530A	200p	IRF9530	400p	TIP162	110p
BD225	31p	BF458	19p	BUH315	200p	IRF9531	200p	TIP141	65p
BD232	31p	BF462	50p	BUH315D	175p	IRF9540	300p	TIP142	75p
BD233	30p	BF471	28p	BUH515	200p	IRF9541	200p	TIP145	50p
BD234	32p	BF472	28p	BUH515D	250p	IRF9610	150p	TIP146	70p
BD235	28p	BF479	30p	BUH517	275p	IRF9620	150p	TIP147	80p
BD236	30p	BF494	16p	BUH517D	175p	IRF9622	200p	TIP150	90p
BD237	21p	BF495	16p	BUH715	425p	IRF9630	325p	TIP151	60p
BD238	24p	BF595	40p	BUT11A	40p	IRF9640	375p	TIP2955	50p
BD239	30p	BF596	16p	BUT11AF	40p	IRFD9220	100p	TIP3055	50p
BD240	40p	BF615	30p	BUT12	80p	IRFBC30	200p	TIPL760	100p
BD241A	40p	BF617	30p	BUT13	310p	IRFBC40	400p	TIPL762A	200p
BD243A	50p	BF760	40p	BUT18	80p	IRFP140	250p	TIPL763A	200p
BD244	50p	BF763	40p	BUT18AF	65p	IRFP150	300p	TIPL791A	80p
BD245	50p	BF870	22p	BUT30V	1700p	IRFP240	300p	2N2369	15p
BD246A	50p	BF871	22p	BUT56A	85p	IRFP250	400p	2N2646	40p
BD265	45p	BF960	38p	BUT76A	80p	IRFP350	325p	2N2904	20p
BD267	45p	BF961	35p	BUT90	1300p	IRFP450	400p	2N2905	20p
BD269	45p	BF964	38p	BUT92	1200p	IRFP460	775p	2N2906	18p
BD278	50p	BFQ232	75p	BUV18	650p	IRFP9140	1450p	2N2907	18p
BD311	100p	BFQ252A	60p	BUV20	650p	IRFP9240	500p	2N3019	28p
BD314	100p	BFR90	85p	BUV21	400p	IRFPC50	600p	2N3053	18p
BD315	150p	BFR91	99p	BUV23	475p	IRFRC20	250p	2N3054	40p
BD317	150p	BR100	14p	BUV24	350p	IRFZ20	65p	2N3055	38p
BD331	40p	BR103	37p	BUV25	110p	IRFZ42	275p	2N3055H	50p
BD332	40p	BR303	85p	BUV26	150p	IRFZ44	275p	2N3440	45p
BD361	60p	BU105	80p	BUV27	125p	MJ2501	100p	2N3441	175p
BD362	60p	BU108	100p	BUV28	110p	MJ2955	55p	2N3442	85p
BD370	30p	BU109	80p	BUV37	175p	MJ3000	100p	2N3771	85p
BD371	30p	BU110	90p	BUV46A	75p	MJ3001	100p	2N3772	90p
BD410	50p	BU111	100p	BUV47	120p	MJ4032	175p	2N3773	100p
BD433	28p	BU124	60p	BUV48A	175p	MJ4035	175p	2N3819	29p

Part	Price
4N35	50p

RECTIFIER DIODES

BY127	8p
BY133	8p
BY164	40p
BY179	35p
BY184	32p
BY206	11p
BY207	20p
BY227	19p
BY228	28p
BY298	15p
BY299	18p
BY329-1200	150p
BY448	20p
BYT11	25p
BYT13-1000	30p
BYV96E	25p
BYW96E	36p
BYX10	15p
BYX55/600	25p
IN4001	3p
IN4002	3p
IN4003	3p
IN4004	3p
IN4005	3p
IN4006	3p
IN4007	4p
IN4148	2p
IN5400	9p
IN5401	8p
IN5402	8p
IN5403	8p
IN5404	8p
IN5405	11p
IN5406	12p
IN5407	12p
IN5408	12p
RGP10	25p
RGP15	25p
RGP30	16p
SR2M	60p

I.C. SOCKETS

8 PIN	4p
14 PIN	5p
16 PIN	6p
18 PIN	9p
20 PIN	10p
22 PIN	12p
24 PIN	13p
28 PIN	13p
40 PIN	15p

ZENER DIODES

400 mWatts

2V7 to 39V	5p

1.3 Watts

2V7 to 39V	9p

VOLTAGE REGULATORS

7805	18p
7806	18p
7808	18p
7812	18p
7815	25p
7818	25p
7824	25p
7905	25p
7906	30p
7908	30p
7912	30p
7915	30p
7918	30p
7924	30p
78L05	24p
78L08	24p
78L12	24p
78L15	24p
78L18	24p
78L24	24p
79L05	35p
79L08	35p
79L12	35p
79L15	35p
LM309K	100p
LM317T	100p
LM323K	350p
78H08KC	800p
79H12KC	700p
79HGKC	800p

LEDs

3mm

RED	5p
YELLOW	8p
GREEN	8p

5mm

RED	5p
YELLOW	8p
GREEN	8p

RECTANGULAR LEDs

5mm x 2.5mm

RED	5p
YELLOW	8p
GREEN	8p

Part	Price
LINEAR ICs	
AN203	210p
AN210	165p
AN211	150p
AN214Q	170p
AN217P	95p
AN228	280p
AN252	150p
AN259	250p
AN262	140p
AN271	230p
AN274	250p
AN277B	400p
AN278	60p
AN301	330p
AN302	650p
AN303	250p
AN304	360p
AN315	210p
AN316	350p
AN337	600p
AN360	100p
AN362	140p
AN363	150p
AN366	150p
AN610	160p
AN3211K	375p
AN3215K	350p
AN3231K	300p
AN3236K	450p
AN3310K	325p
AN3312	350p
AN3313	300p
AN3320K	450p
AN3331K	450p
AN3792	300p
AN3794	325p
AN3814K	450p
AN3821K	600p
AN3822K	600p
AN3830K	800p
AN3990K	300p
AN3991K	400p
AN5010	250p
AN5011	225p
AN2020	80p
AN5025	250p
AN5033	400p
AN5034	400p
AN5070	125p
AN5071	100p
AN5111	450p
AN5132	250p
AN5135NK	400p
AN5138NK	350p
AN5150	400p
AN5151	200p
AN5210	675p
AN5215	100p
AN5222	200p
AN5250	160p
AN5256	150p
AN5260	300p
AN5262	175p
AN5265	80p
AN5315	600p
AN5352	600p
AN5411	450p
AN5421	150p
AN5429	420p
AN5431	275p
AN5435	125p
AN5436N	160p
AN5512	100p
AN5515	160p
AN5520	550p
AN5521	100p
AN5560	350p
AN5601K	750p
AN5612	200p
AN5613	200p
AN5615	300p
AN5620	250p
AN5622	275p
AN5625	400p
AN5630	375p
AN5633	350p
AN5635N	330p
AN5640	500p
AN5700	90p
AN5701	150p
AN5710	100p
AN5712	180p
AN5720	70p
AN5722	140p
AN5730	160p
AN5732	120p
AN5750	75p
AN5753	130p
AN5763	250p
AN5790	240p
AN5791	225p
AN5836	450p
AN5862K	225p
AN5900	130p
AN608P	125p
AN620	250p
AN6130	130p
AN6135	120p
AN6209	350p
AN6250	80p
AN6247	200p
AN6270	400p
AN6300	600p
AN6306	380p
AN6310	200p
AN6320	180p
AN6326N	250p
AN6332	320p
AN6340	600p
AN6341	200p
AN6342	325p
AN6344	440p
AN6345	400p
AN6346	350p
AN6350	610p
AN6352	450p
AN6356	300p
AN6359	500p
AN6360	320p
AN6362	400p
AN6363	375p
AN6367NK	400p
AN6368	275p
AN6371	350p
AN6387	480p
AN6550	100p
AN6551	50p
AN6552	45p
AN6554	80p
AN6555	50p
AN6605	35p
AN6612	60p
AN6650	45p
AN6651	45p
AN6652	45p
AN6671K	425p
AN6676	600p
AN6780S	80p
AN6870	450p
AN6875	150p
AN6878	65p
AN6879	225p
AN6880	75p
AN6882	300p
AN6884	200p
AN6888	150p
AN6889	100p
AN6913	60p
AN700	650p
AN7010K	250p
AN7025K	90p
AN7060	175p
AN7062	300p
AN7072	250p
AN7081K	200p
AN7105	170p
AN7106K	135p
AN7110	75p
AN7111	100p
AN7112	45p
AN7114	120p
AN7115	110p
AN7116	90p
AN7117	65p
AN7120	100p
AN7130	75p
AN7131	90p
AN7133N	325p
AN7134	300p
AN7140	170p
AN7141	70p
AN7142	80p
AN7145	195p
AN7146	210p
AN7147	180p
AN7148	140p
AN7149	160p
AN7154	180p
AN7156	240p
AN7158	310p
AN7160	350p
AN7161N	375p
AN7163	175p
AN7166	350p
AN7168	200p
AN7169	225p
AN7170	260p
AN7171K	400p
AN7172K	325p
AN7173K	450p
AN7177	375p
AN7178	180p
AN7205	35p
AN7213	40p
AN7216	175p
AN7218	60p
AN7220	85p
AN7222	75p
AN7223	105p
AN7224	75p
AN7225	175p
AN7254	150p
AN7256	250p
AN7273	75p
AN7410	60p
AN7311	90p
AN7312	70p
AN7315	40p
AN7330	110p
AN7362	200p
AN7363	225p
AN7410	150p
AN7411	50p
AN7414	275p
AN7415	70p
AN7470	100p
AN8053	200p
AN8275	250p
AN8370	1000p
AN8377	400p
AN8387	350p
BA222	65p
BA225	100p
BA314	40p
BA301	55p
BA311	80p
BA313	60p
BA333	80p
BA335	55p
BA338	80p
BA340	75p
BA343	60p
BA336	175p
BA401	60p
BA402	50p
BA511	145p
BA514	160p
BA516	150p
BA518	150p
BA521	100p
BA524	240p
BA526	180p
BA527	95p
BA532	100p
BA534	220p
BA536	150p
BA546	160p
BA612	120p
BA614	70p
BA618	55p
BA631	280p
BA656	110p
BA658	350p
BA681A	350p
BA682A	300p
BA683A	300p
BA684	400p
BA685	400p
BA715	45p
BA718	45p
BA728	55p
BA806	220p
BA843	130p
BA1310	160p
BA1320	75p
BA1330	120p
BA1332	60p
BA1350	130p
BA1355	125p
BA1356	100p
BA1360	160p
BA1404	120p
BA1604	125p
BA2266A	250p
BA3306	60p
BA3308	70p
BA3312	60p
BA3402	90p
BA3406AL	120p
BA3416BL	80p
BA3422	350p
BA3505F	140p
BA3506A	70p
BA3516	120p
BA3520	130p
BA3521	225p
BA3704	200p
BA3706	75p
BA3812L	80p
BA3822LS	80p
BA3824LS	75p
BA3920	300p
BA4110	75p
BA4210	85p
BA4220	60p
BA4234L	70p
BA4236L	110p
BA4402	45p
BA4403	220p
BA4405	80p
BA4412	50p
BA5101	350p
BA5102	140p
BA5115	75p
BA5115L	75p
BA5204	200p
BA5208AF	110p
BA5402	180p
BA5406	180p
BA5408	180p
BA5413	225p
BA6104	250p
BA6109	110p
BA6110	225p
BA6125	75p
BA6137	55p
BA6138	130p
BA6146	150p
BA6149LS	700p
BA6154	60p
BA6208	175p
BA6209	85p
BA6218	85p
BA6220	55p
BA6248	140p
BA6259	170p
BA6280AF	300p
BA6290A	200p
BA6294	250p
BA6302A	150p
BA6304	120p
BA6305	140p
BA6321	250p
BA6328	250p
BA6334	75p
BA6410	220p
BA6411	250p
BA6418N	100p
BA6435S	425p
BA6993	150p
BA7001	150p
BA7004	200p
BA7007	200p
BA7021	180p
BA7022	350p
BA7025L	100p
BA7107	475p
BA7212S	200p
BA7252S	150p
BA7604N	100p
BA7751LS	150p
BA7752	250p
BA7755	150p
BA7767AS	155p
BA8504	350p
BA15218	60p
CA3140E	38p
CNX62A	80p
CNX82A	60p
CNX83A	80p
CX136	600p
CX139A	750p
CX141	750p
CX145	725p
CX150B	325p
CX175	325p
CX187	825p
CX804A	775p
CX867	575p
CX868	525p
CX877	300p
CX7925B	550p
CX20015A	600p
CX20106A	75p
CX20109	140p
CX20187	700p
CXA1001AP	1600p
CXA1019P	150p
CXA1019S	225p
CXA1044P	550p
CXA1044BP	475p
CXA1081	275p
CXA1081M	250p
CXA1081S	300p
CXA1082AS	1000p
CXA1191M	250p
CSA1209P	400p
FT5754M	600p
FT5764M	250p
HA1124	125p
HA1125	120p
HA1137W	150p
HA1137	175p
HA1197	130p
HA1199	130p
HA1201	225p
HA1202	125p
HA1319	200p
HA1338	300p
HA1339A	350p
HA1367	300p
HA1377	120p
HA1384	600p
HA1388	320p
HA1389	210p
HA1392	120p
HA1394	170p
HA1396	650p
HA1397	200p
HA1398	175p
HA1406	120p
HA11123	350p
HA11211	170p
HA11215	350p
HA11219	280p
HA11221	180p
HA11225	130p
HA11235	100p
HA11244	375p
HA11247	375p
HA11251	120p
HA11412	600p
HA11414	300p
HA11423	110p
HA11440	250p
HA11485BN	400p
HA11702	330p
HA11703	400p
HA11706	280p
HA11710	500p
HA11713	250p
HA11715	250p
HA11716	480p
HA11718	700p
HA11724	650p
HA11741NT	950p
HA11744	330p
HA11745	330p
HA11749	350p
HA11751	1500p
HA11752	325p
HA11839NT	375p
HA11847	700p
HA12002	220p
HA12003	180p
HA12005	180p
HA12010	300p
HA12016	120p
HA12017	100p
HA12026	125p
HA12038NT	140p
HA12044	350p
HA12045	280p
HA12047	450p
HA12058	320p
HA12088	375p
HA12116	130p
HA12411	175p
HA12412	175p
HA12413	70p
HA12430	200p

K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX HA9 0HB, ENGLAND

Telephone: 0181-900 2329 Fax: 0181-903 6126 E-Mail: grandata.ltd@btinternet.com

PLEASE PHONE US FOR TYPES NOT LISTED AS WE HAVE OVER 50,000 ITEMS IN STOCK. QUOTATIONS GIVEN FOR LARGE QUANTITIES

LINEAR ICs

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
HA13001	110p	LA2800	350p	LA7096	200p	LF353	48p	MC3302	50p	SAB3029	525p	STK3102 II	530p	STK5478	380p	STR16006	500p	TA7281	170p
HA13002	200p	LA3120	200p	LA7113	275p	LF355	60p	MC3401	45p	SAB3035	275p	STK3106	2500p	STK5479	300p	STR17006	500p	TA7282	160p
HA13006	400p	LA3150	200p	LA7116	125p	LF357	70p	MC3423P	100p	SAB3036	725p	STK3122 III	725p	STK5481	470p	STR20005	450p	TA7210	200p
HA13007	300p	LA3160	120p	LA7123	1300p	LF398	300p	MC3488AP	250p	SAB3037	700p	STK3152 II	900p	STK5482	285p	STR20012	450p	TA7283	200p
HA13108	280p	LA3161	40p	LA7210	60p	LH2426S	600p	MC34063AP	300p	SAB3042	825p	STK3156	500p	STK5483	440p	STR20015	450p	TA7284P	400p
HA13117	175p	LA3210	65p	LA7212	150p	LM301	26p	MN1220T	400p	SAB3064	130p	STK4017	400p	STK5486	450p	STR30110	330p	TA7288	220p
HA13118	140p	LA3226	60p	LA7214	150p	LM311	35p	MN1226	450p	SAB3209	225p	STK4019	480p	STK5487	525p	STR30115	275p	TA7291P	200p
HA13119	140p	LA3246	75p	LA7220	125p	LM319	165p	MN1228	600p	SAB3210	250p	STK4021	380p	STK5488	480p	STR30120	400p	TA7292P	325p
HA13127	350p	LA3300	140p	LA7222	110p	LM324	30p	MN1276	1300p	SAB6456	125p	STK4024 II	550p	STK5490	450p	STR30123	450p	TA7294P	450p
HA13128	400p	LA3301	110p	LA7224	150p	LM335Z	120p	MN1280	70p	SAB8048	225p	STK4025	530p	STK5632	450p	STR30125	550p	TA7299	200p
HA13130	450p	LA3361	100p	LA7225	250p	LM339	35p	MN3004	600p	SAB8051AP	700p	STK4026	480p	STK5720	400p	STR30130	250p	TA7302P	75p
HA13135	500p	LA3365	70p	LA7292	275p	LM348	50p	MN3005	2000p	SDA2003	450p	STK4028	550p	STK5725	450p	STR40090	350p	TA7303	70p
HA13139	600p	LA3370	70p	LA7294	200p	LM358	45p	MN3011	4000p	SDA2004	325p	STK4032 II	510p	STK5730	450p	STR40115	600p	TA7307	100p
HA13150A	1150p	LA3373	70p	LA7295	160p	LM380	80p	MN3101	110p	SDA2005	700p	STK4034 X	925p	STK6316	300p	STR41090	330p	TA7310	100p
HA13151	875p	LA3375	300p	LA7297	120p	LM381	150p	MN3102	110p	SDA2007	300p	STK4036	470p	STK6324B	500p	STR43111	950p	TA7320P	200p
HA13403	400p	LA3376	80p	LA7305A	350p	LM382	130p	MN3207	375p	SDA2008	400p	STK4038	680p	STK6327	1200p	STR44115	475p	TA7322	130p
HA13406W	400p	LA3380	300p	LA7308	70p	LM386	60p	MN3208	950p	SDA2112	450p	STK4040 II	650p	STK6328A	800p	STR45111	550p	TA7323	80p
HA13408	350p	LA3390	250p	LA7311	200p	LM387	100p	MN6030B	350p	SDA2120	200p	STK4042 II	800p	STK6431	850p	STR50020	350p	TA7325	90p
HA13412	600p	LA3400	250p	LA7320	120p	LM389N	105p	MN6163A	700p	SDA2131	225p	STK4044	800p	STK6607	400p	STR50092	550p	TA7326	200p
HA13426	500p	LA3401	90p	LA7323	325p	LM393	45p	MTA001M	600p	SDA2208	450p	STK4046	950p	STK6722	725p	STR50103A	260p	TA7328	110p
HA13432	400p	LA3410	150p	LA7330	350p	LM431	50p	NE555	20p	SDA4212	775p	STK4048	1280p	STK6732	1000p	STR50113	500p	TA7330P	80p
HA13441	450p	LA3430	135p	LA7331	250p	LM710	45p	NE556	40p	SDA5241	725p	STK4050 II	1600p	STK6822	900p	STR50115	500p	TA7331P	80p
HA17524	250p	LA3600	60p	LA7332	225p	LM723	40p	NE558	80p	SDA5243-2	450p	STK4060	510p	STK6922	500p	STR51041	500p	TA7333	100p
KA2102	100p	LA3605	100p	LA7340	300p	LM741DIL	18p	NE565	110p	SDA5343	1450p	STK4065	650p	STK6932	525p	STR50213	500p	TA7335	85p
KA2130	150p	LA3607	125p	LA7376	150p	LM741MET	45p	NE567	115p	SDA5640	200p	STK4101	500p	STK6962	275p	STR53041	500p	TA7336	180p
KA2131	110p	LA4030	180p	LA7391	550p	LM747	55p	NE571	290p	SDA5642	450p	STK4111	500p	STK6972	490p	STR54041	320p	TA7339P	175p
KA2206	150p	LA4031	140p	LA7520	200p	LM1017	200p	NE592	85p	SDA5644	500p	STK4112	500p	STK6981B	800p	STR55041	450p	TA7340	250p
KA2209	125p	LA4032	140p	LA7530	200p	LM1035N	350p	NE5532P	140p	SGFS465	500p	STK4121	480p	STK6982	600p	STR56041	550p	TA7341	250p
KA2210	230p	LA4051	160p	LA7535	175p	LM1040N	650p	SAA1000	350p	SLA4031	750p	STK4122	560p	STK6982H	600p	STR58041	285p	TA7342P	70p
KA2212	65p	LA4100	85p	LA7545	160p	LM1203	225p	SAA1004	650p	SLA7020M	450p	STK4131	480p	STK7216	420p	STR59041	350p	TA7343	120p
KA2213	130p	LA4101	80p	LA7550	275p	LM1203AN	225p	SAA1005	325p	STA301A	200p	STK4132 II	600p	STK7217	400p	STR60001	525p	TA7347P	120p
KA2214	100p	LA4102	100p	LA7555	150p	LM1875T	330p	SAA1006	300p	STA341M	180p	STK4133 II	750p	STK7225	500p	STR80145	475p	TA7348P	125p
KA2224	50p	LA4110	120p	LA7620	500p	LM1881N	375p	SAA1008	450p	STA401A	220p	STK4141 II	420p	STK7226	600p	STR81145	450p	TA7349P	175p
KA2244	75p	LA4120	270p	LA7680	675p	LM1886	250p	SAA1010	400p	STA403A	270p	STK4142	530p	STK7251	500p	STR90120	425p	TA7339P	175p
KA2261	100p	LA4138	105p	LA7681	650p	LM1889	300p	SAA1024	250p	STA405A	280p	STK4147 II	1450p	STK7253	450p	STRD1206	500p	TA7337P	175p
KA2263	100p	LA4140	60p	LA7710	250p	LM1894N	200p	SAA1025	250p	STA431A	250p	STK4151	680p	STK7308	350p	STRD1406	600p	TA7339P	175p
KA2264	100p	LA4142	65p	LA7800	90p	LM1895N	275p	SAA1026	400p	STA432A	220p	STK4152	650p	STK7309	400p	STRD1706	380p	TA7341	250p
KA2284	75p	LA4145	65p	LA7801	100p	LM2901N	35p	SAA1027	400p	STA434A	270p	STK4161	650p	STK7310	470p	STRD1806	360p	TA7342P	70p
KA2309	175p	LA4160	100p	LA7802	300p	LM2902N	40p	SAA1029	150p	STA435A	270p	STK4162	550p	STK7348	400p	STRD1816	350p	TA7343	120p
KA2401	150p	LA4162	110p	LA7806	260p	LM2903N	40p	SAA1042	325p	STA441C	220p	STK4164 II	1175p	STK7356	425p	STRD1906	700p	TA7347P	120p
KA2412	225p	LA4178	150p	LA7808	250p	LM3900	40p	SAA1043P	675p	STA451C	280p	STK4171	900p	STK7358	440p	STRD3035	300p	TA7348P	125p
KA2912	125p	LA4180	150p	LA 7820	100p	LM3909	100p	SAA1044	400p	STA456C	240p	STK4172 II	680p	STK7402	560p	STRD4412	500p	TA7349P	175p
KA2913A	175p	LA4182	180p	LA7823	200p	LM3911N	200p	SAA1056	300p	STA471	210p	STK4181	680p	STK7404	400p	STRD4420	550p	TA7354P	65p
KA2914A	200p	LA4190	300p	LA7824	130p	LM3914	160p	SAA1057	375p	STA901M	280p	STK4182 II	750p	STK7406	650p	STRD4512	400p	TA7357	340p
KA22427	100p	LA4192	140p	LA7830	90p	LM3915	160p	SAA1058	225p	STK0025	420p	STK4191	700p	STK7408	675p	STRD5441	560p	TA7358	85p
KIA6213S	60p	LA4200	130p	LA7831	85p	LM3916	270p	SAA1060	375p	STK0029	360p	STK4192	700p	STK7410	1500p	STRD5541	450p	TA7359P	90p
KIA6210AH	400p	LA4201	120p	LA7832	130p	LM8363	320p	SAA1061	250p	STK0039	600p	STK4211 II	1000p	STK7458	1250p	STRD6006	575p	TA7361	125p
KIA6281H	250p	LA4260	230p	LA7835	150p	LM8560	175p	SAA1062	250p	STK0040	520p	STK4211 V	800p	STK7854	800p	STRD6009E	450p	TA7362	150p
KIA6283K	150p	LA4261	300p	LA7837	150p	LM13600	150p	SAA1063	250p	STK0049	510p	STK4221 II	1200p	STK7561	650p	STRD6018	450p	TA7364P	175p
KIA6299H	210p	LA4265	125p	LA7838	200p	LM13700	125p	SAA1064	275p	STK0050	440p	STK4231 II	700p	STK7562	1000p	STRD6602	475p	TA7366P	65p
KIA7227CP	200p	LA4270	300p	LA7850	225p	LM18293	500p	SAA1070	550p	STK0059	620p	STK4241	1050p	STK7563	800p	STRD6601	650p	TA7368P	35p
KIA7313	45p	LA4282	350p	LA7851	200p	M491BB1	600p	SAA1073	325p	STK0060	820p	STK4241 V	1250p	STK7573	400p	STRM6545	900p	TA7373F	150p
L149V	300p	LA4420	140p	LA7910	150p	M494B1	700p	SAA1075	350p	STK0070	1100p	STK4272	500p	STK7576	1500p	STRM6546	900p	TA7374	175p
L165V	250p	LA4422	130p	LA7913	90p	M5265P	200p	SAA1086	175p	STK0080	580p	STK4273	550p	STK7703	1000p	STRM6549	500p	TA7376P	100p
L200	200p	LM4425A	200p	LA7930	350p	M50115P	320p	SAA1089	325p	STK011	330p	STK4301	500p	STK8050	750p	STRS5741	800p	TA7378P	60p
L272	200p	LA4430	130p	LA7940	200p	M50117P	500p	SAA1101	700p	STK015	440p	STK4311	650p	STK8250	500p	STRS5941	750p	TA7401	250p
L272M	110p	LA4440	200p	LA7953	300p	M50119P	525p	SAA1124	200p	STK016	760p	STK4332	365p	STK8260	1200p	STRS6307	600p	TA7402P	200p
L290B	225p	LA4445	200p	LA9200	300p	M50422P	750p	SAA1130	550p	STK025	650p	STK4352	500p	STK8280	1850p	STRS6308	600p	TA7403	325p
L291B	300p	LA4446	170p	LB1205	170p	M50461	350p	SAA1250	280p	STK0050	1600p	STK4362	450p	STK7405 II	550p	STRS6309	600p	TA7404	150p
L292	750p	LA4460	120p	LB1216	150p	M50784	300p	SAA1251	380p	STK077	520p	STK4372	490p	STK73410	350p	STRS6707	1000p	TA7405P	200p
L293B	225p	LA4461	120p	LB1258	100p	M50786	500p	SAA1271	400p	STK078	580p	STK4392	500p	STK7340 II	500p	STRS6708	575p	TA7411AP	150p
L293C	325p	LA4466	225p	LB1268	70p	M50790	600p	SAA1274	280p	STK080	550p	STK4412	450p	STK73605	375p	TA7054	190p	TA7415P	350p
L293D	225p	LA4470	300p	LB1274	85p	M51014L	120p	SAA1290	750p	STK082	540p	STK4432	600p	STK73907	700p	TA7061	115p	TA7417AP	225p
L293E	250p	LA4475	225p	LB1290	120p	M51143AL	110p	SAA1293	550p	STK084	600p	STK4773	820p	STK78617	2400p	TA7062	200p	TA7421P	350p
L294	475p	LA4476	225p	LB1292	110p	M51161	300p	SAA1294	800p	STK085	900p	STK4793	800p	STR370	300p	TA7066	120p	TA7427AP	225p
L295	450p	LA4480	225p	LB1405	70p	M51161P	250p	SAA1300	200p	STK086	800p	STK4803	640p	STR371	400p	TA7075P	300p	TA7521P	350p
L297	525p	LA4485	300p	LB1407	130p	M51162P	250p	SAA1310	200p	STK0100	900p	STK4813	800p	STR380	350p	TA7089	300p	TA7607	200p
L298	400p	LA4495	250p	LB1409	200p	M51164AL	80p	SAA1350	275p	STK0100II	1200p	STK4833	700p	STR381	390p	TA7102P	500p	TA7608	360p
L465A	525p	LA4496	250p	LB1412	300p	M51166P	300p	SAA1351	750p	STK420	400p	STK4843	720p	STR383	410p	TA7119	150p	TA7609	170p
L482	400p	LA4498	275p	LB1415	100p	M51182L	110p	SAA1900S	475p	STK430	500p	STK4853	730p	STR384	350p	TA7120	55p	TA7611	210p
L497B	250p	LA4500	200p	LB1416	85p	M51191L	85p	SAA3004	400p	STK433	400p	STK4863	700p	STR440	800p	TA7124	250p	TA7612	300p
L702B	400p	LA4505	220p	LB1426	125p	M51231P	200p	SAA3006P	225p	STK435	375p	STK4873	850p	STR441	950p	TA7130P	85p	TA7613AP	90p
L702N	325p	LA4508	200p	LB1450	110p	M51308SP	550p	SAA3007P	130p	STK436	430p	STK4893	1000p	STR442	1600p	TA7137	60p	TA7614	170p
L2720	150p	LA4510	100p	LB1615	270p	M51310AP	900p	SAA3008P	200p	STK437	460p	STK4913	900p	STR450A	700p	TA7140	100p	TA7616	300p
L2722	175p	LA4520	170p	LB1620	210p	M51316P	300p	SAA3010P	300p	STK439	500p	STK5314	475p	STR451	800p	TA7141	825p	TA7621	300p
L4960	325p	LA4550	200p	LB1622	220p	M51320	200p	SAA3027P	375p	STK441	680p	STK5315	500p	STR452	600p	TA7150P	250p	TA7622	420p
L6203	600p	LA4555	120p	LB1630	80p	M51356P	400p	SAA3049P	550p	STK443	700p	STK5322	500p	STR453	500p	TA7157	100p	TA7628	110p
L6210	250p	LA4557	150p	LB1639	300p	M51358P	150p	SAA4700	425p	STK457	470p	STK5323	600p	STR454	1300p	TA7172P	150p	TA7629	220p
L6221AS	300p	LA4558	125p	LB1640	150p	M51365P	350p	SAA5000	200p	STK459	560p	STK5324	450p	STR455	550p	TA7193	320p	TA7630	200p
L6506	300p	LA4570	130p	LB1641	75p	M51366P	360p	SAA5010	220p	STK460	560p	STK5325	470p	STR456	470p	TA7200	200p	TA7632	400p
LA1130	240p	LA4571	175p	LB1642	150p	M51381P	200p	SAA5012	400p	STK461	600p	STK5326	750p	STR457	600p	TA7205	150p	TA7640	90p
LA1135	120p	LA4581	175p	LB1645	100p	M51384AP	750p	SAA5020	350p	STK463	950p	STK5330	850p	STR470	400p	TA7207	150p	TA7641	140p
LA1145	200p	LA4597	125p	LB1648	200p	M51387P	600p	SAA5030	440p	STK465	720p	STK5331	300p	STR1096	275p	TA7208	125p	TA7644BP	480p
LA1150	150p	LA4620	400p	LB1649	190p	M51392P	300p	SAA5040A	280p	STK501	550p	STK5332	180p	STR1195	350p	TA7210	200p	TA76545P	65p
LA1170	90p	LA4630	325p	LB3500	125p	M51393AP	350p	SAA5040B	400p	STK561	450p	STK5333	650p	STR1229	325p	TA7214	220p	TA7658	100p
LA1177	130p	LA4700	350p	LC4966	65p	M51395AP	450p	SAA5041	550p	STK563	415p	STK5335	350p	STR2005	400p	TA7217	145p	TA7659P	400p
LA1180	75p	LA4705	400p	LC7011	500p	M51397AP	425p	SAA5042	425p	STK583	500p	STK5336	350p	STR2012	400p	TA7220	220p	TA7660P	325p
LA1185	150p	LA5005	90p	LC7060	600p	M51436P	350p	SAA5050	650p	STK760	600p	STK5337	500p	STR2013	300p	TA7222	90p	TA7666P	100p
LA1186	35p	LA5112	200p	LC7120	350p	M51496P	275p	SAA5051	400p	STK770	400p	STK5338	295p	STR2015	550p	TA7223	210p	TA7668	100p
LA1201	75p	LA5511	50p	LC7130	300p	M51533	300p	SAA5052	500p	STK772	650p	STK5339	400p	STR2024	575p	TA7225	300p	TA7672	400p
LA1205	75p	LA5512	50p	LC7131	260p	M51544	150p	SAA5054	600p	STK772B	480p	STK5340	350p	STR2105	600p	TA7226	290p	TA7676AP	450p
LA1207	120p	LA5522	46p	LC7132	400p	M51548	150p	SAA5230	850p	STK780	575p	STK5342	245p	STR2124	675p	TA7227	170p	TA7679	475p
LA1210	140p	LA5523	150p	LC7137	450p	M54523P	200p	SAA5231	170p	STK795	450p	STK5343	380p	STR3105	525p	TA7230	100p	TA7680AP	200p
LA1222	80p	LA5524	80p	LC7181	350p	M54563P	200p	SAA5240PA	600p	STK1039	460p	STK5353	400p	STR3113	225p	TA7232	95p	TA7681AP	425p
LA1230	130p	LA5527	150p	LC7185	350p	M58484	500p	SAA5243PE	360p	STK1040	640p	STK5361	375p	STR3115	400p	TA7233	120p	TA7687AP	100p
LA1235	130p	LA5530	65p	LC7191	300p	M51516	260p	SAA5244AP	950p	STK1049	700p	STK5362	400p	STR3123	400p	TA7237	300p	TA7688AP	150p
LA1240	80p	LA5531	65p	LC7207	275p	M51518	200p	SAA5246AP	380p	STK1050	650p	STK5372	260p	STR3125	480p	TA7238	400p	TA7696P	100p
LA1245	110p	LA5537	45p	LC7215	160p	M51995P	250p	SAA5246P	750p	STK1060	700p	STK5373	375p	STR3130	500p	TA7240	160p	TA7699	600p
LA1260	75p	LA5655	175p	LC7217	350p	M51977P	300p	SAA5250P	750p	STK1070	850p	STK5391	375p	STR3135	250p	TA7241	165p	TA7705	300p
LA1261	75p	LA5658	225p	LC7218	250p	M52307P	900p	SAA5351	375p	STK1080	940p	STK5392	500p	STR3212	275p	TA7242	190p	TA7709P	150p
LA1265	125p	LA5665	250p	LC7230	700p	M54646AP	400p	SAA7000	550p	STK2025	620p	STK5421	450p	STR3214	275p	TA7243	320p	TA7719P	200p
LA1266	130p	LA5667	200p	LC7267	550p	MB3708	275p	SAA7020	600p	STK2028	500p	STK5422	375p	STR3215	275p	TA7245	225p	TA7727P	125p
LA1267	150p	LA5700	300p	LC7351	200p	MB3712	140p	SAA7210P	1300p	STK2029	480p	STK5431	550p	STR3315	275p	TA7245BPO	200p	TA7750	200p
LA1354	225p	LA6339	35p	LC7364	200p	MB3713	130p	SAA7220PA	550p	STK2030	875p	STK5434	570p	STR4090A	650p	TA7248P	575p	TA7757	200p
LA1363	90p	LA6355	50p	LC7432	425p	MB3714	225p	SAA7274P	600p	STK2038	700p	STK5436	500p	STR4142	450p	TA7250B	325p	TA7769	130p
LA1364	200p	LA6510	150p	LC7522	350p	MB3715	250p	SAA7280P	1450p	STK2048	950p	STK5441	400p	STR4211	315p	TA7251BP	325p	TA7772P	150p
LA1365	120p	LA6515	150p	LC7535	300p	MB3722	200p	SAA9050	450p	STK2058IV	1600p	STK5443	575p	STR4512	400p	TA7256P	225p	TA7784	250p
LA1368	220p	LA6520	175p	LC7537AN	400p	MB3730	900p	SAA9057	475p	STK2101	1050p	STK5446	350p	STR5015	500p	TA7259P	225p	TA7792P	250p
LA1369	200p	LA6531	250p	LC7537N	450p	MB3731	220p	SAB0600	600p	STK2110	550p	STK5451	390p	STR5100	550p	TA7262P	400p	TA7796P	75p
LA1385	170p	LA7007	400p	LC7560	750p	MB3732	240p	SAB0601	525p	STK2125	580p	STK5461	500p	STR5214	475p	TA7263P	325p	TA7799P	175p
LA1503	120p	LA7011	220p	LC7565	300p	MB3735	400p	SAB0602	625p	STK2129	750p	STK5462	500p	STR5315	575p	TA7265AP	300p	TA8101N	230p
LA1805	175p	LA7016	45p	LC7582E	300p	MB3756	160p	SAB1009BP	225p	STK2139	675p	STK5464	300p	STR5412	280p	TA7267	220p	TA8101P	230p
LA1810	130p	LA7018	100p	LC7800	175p	MB3759	200p	SAB1016	600p	STK2155	900p	STK5466	500p	STR6020	270p	TA7267BP	120p	TA8105N	140p
LA1851	300p	LA7019	130p	LC7815H	175p	MB3771	110p	SAB1046P	350p	STK2230	470p	STK5467	400p	STR7001	600p	TA7269	260p	TA8105P	140p
LA2000	150p	LA7033	400p	LC7818	280p	MB3773	110p	SAB2015P	525p	STK2240	740p	STK5468	300p	STR9005	400p	TA7270	170p	TA8110AP	110p
LA2001	200p	LA7042	280p	LC7820	325p	MB8719	360p	SAB2016P	150p	STK2250	650p	STK5471	330p	STR9012	450p	TA7271	220p	TA8119P	70p
LA2101	270p	LA7046	300p	LC7821N	250p	MC1391	120p	SAB2022P	525p	STK3041	370p	STK5472	375p	STR10006	450p	TA7272	260p	TA8122AN	250p
LA2110	150p	LA7051	130p	LC7822N	160p	MC1455	45p	SAB3012	675p	STK3042	375p	STK5473	480p	STR11006	325p	TA7273	300p	TA8127N	100p
LA2200	190p	LA7053	130p	LC7881B	135p	MC1488	35p	SAB3013	200p	STK3044	500p	STK5474	500p	STR12006	450p	TA7274	210p	TA8132AN	200p
LA2205	150p	LA7054	350p	LC7881M	325p	MC1489	35p	SAB3017	320p	STK3062	500p	STK5476	350p	STR13006	500p	TA7279P	325p		
LA2211	350p	LA7060	150p	LF347	110p	MC1496	65p	SAB3021	450p	STK3082	550p	STK5477	450p	STR15006	500p	TA7280	190p		

Please add £1 P&P and VAT at 17.5% to all orders

All brand new components

We accept payment by Access, Switch, Visa, Cheque and Postal Order. (Government, College etc orders accepted)

Prices quoted are subject to availability and may be changed without prior notice

LINEAR ICs/JAPANESE TRANSISTORS

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
TA8164P	100p	TDA1180	120p	TDA2760	400p	TDA4661	225p	TDA8391	675p	UPC1004C	130p	2SA771	90p	2SA1177	25p	2SB561	30p	2SC738	15p
TA8184P	350p	TDA1185A	190p	TDA2780	600p	TDA4670	475p	TDA8395	450p	UPC1009	950p	2SA773	50p	2SA1179	20p	2SB562	20p	2SC739	150p
TA8189P	130p	TDA1190	80p	TDA2791	275p	TDA4680	475p	TDA8405	550p	UPC1018	170p	2SA777	35p	2SA1182	20p	2SB564	15p	2SC761	110p
TA8200AH	325p	TDA1200B	80p	TDA2795	200p	TDA4685	475p	TDA8415	650p	UPC1020	200p	2SA778	100p	2SA1184	120p	2SB566	90p	2SC762	150p
TA8201AK	300p	TDA1220	75p	TDA2822M	60p	TDA4700A	750p	TDA8416	625p	UPC1023	60p	2SA781	150p	2SA1185	200p	2SB596	50p	2SC783	85p
TA8205	220p	TDA1235	300p	TDA2824	85p	TDA4714C	350p	TDA8417	550p	UPC1024H 2	75p	2SA786	25p	2SA1186	500p	2SB598	30p	2SC790	50p
TA8207K	175p	TDA1236	240p	TDA2840	200p	TDA4716C	450p	TDA8421	500p	UPC1025	230p	2SA794	50p	2SA1198	40p	2SB600	500p	2SC792	380p
TA8210	260p	TDA1251	150p	TDA3047	100p	TDA4718A	500p	TDA8425	500p	UPC1026	95p	2SA798	30p	2SA1201	40p	2SB601	60p	2SC805	225p
TA8211AH	200p	TDA1270	150p	TDA3048	130p	TDA4725	750p	TDA8432	550p	UPC1028	90p	2SA812	15p	2SA1202	25p	2SB605	25p	2SC828	20p
TA8214K	260p	TDA1327	200p	TDA3082	200p	TDA4800	350p	TDA8433	600p	UPC1031H	150p	2SA814	60p	2SA1204	225p	2SB631	40p	2SC829	15p
TA8215	300p	TDA1405	50p	TDA3083	200p	TDA4810	250p	TDA8440	300p	UPC1032	60p	2SA816	70p	2SA1206	60p	2SB632	45p	2SC839	20p
TA8216H	300p	TDA1410	220p	TDA3190	100p	TDA4814A	300p	TDA8442	200p	UPC1035C	110p	2SA817	20p	2SA1207	25p	2SB633	80p	2SC867	900p
TA8217P	120p	TDA1412	35p	TDA3301B	400p	TDA4850	475p	TDA8443	350p	UPC1043C	125p	2SA825	20p	2SA1208	70p	2SB641	12p	2SC870	100p
TA8220AH	500p	TDA1506	275p	TDA3310	120p	TDA4851	400p	TDA8444	200p	UPC1158H	70p	2SA836	20p	2SA1209	100p	2SB647	20p	2SC897	175p
TA8221AH	600p	TDA1508	175p	TDA3410	150p	TDA4852	400p	TDA8451	400p	UPC1161	110p	2SA837	200p	2SA1210	120p	2SB648	45p	2SC900B	30p
TA8225H	475p	TDA1510	170p	TDA3420	200p	TDA4860	200p	TDA8452	200p	UPC1167	125p	2SA839	110p	2SA1215	600p	2SB649	35p	2SC930	15p
TA8225L	475p	TDA1512	180p	TDA3501	340p	TDA4866	325p	TDA8453	350p	UPC1170	150p	2SA841	20p	2SA1216	550p	2SB673	100p	2SC936	300p
TA8227	250p	TDA1514A	450p	TDA3502	450p	TDA4881	200p	TDA8461	950p	UPC1173	200p	2SA844	20p	2SA1217	100p	2SB676	85p	2SC941	15p
TA8229K	200p	TDA1515A	200p	TDA3504	300p	TDA4935	300p	TDA8490	350p	UPC1176C	120p	2SA847	25p	2SA1220	75p	2SB688	90p	2SC944	140p
TA8400P	200p	TDA1516Q	350p	TDA3505	275p	TDA4940	325p	TDA8540	250p	UPC1178H	250p	2SA854	30p	2SA1221	70p	2SB703	90p	2SC945	10p
TA8410K	200p	TDA1517	250p	TDA3506	260p	TDA4942	325p	TDA8702	275p	UPC1180C	200p	2SA861	45p	2SA1222	50p	2SB705	200p	2SC950	40p
TA8410P	200p	TDA1519	450p	TDA3508	450p	TDA4946	250p	TDA8703	500p	UPC185H2	400p	2SA872	25p	2SA1226	25p	2SB707	200p	2SC959	225p
TA8432	200p	TDA1519A	200p	TDA3510	350p	TDA4950	120p	TDA8708	900p	UPC1186	80p	2SA872A	50p	2SA1227	250p	2SB716	20p	2SC980	40p
TA8605N	350p	TDA1520	275p	TDA3520	650p	TDA5030A	150p	TDA8730	225p	UPC1187	150p	2SA879	30p	2SA1232	180p	2SB718	60p	2SC982	20p
TA8606N	350p	TDA1521	250p	TDA3530	350p	TDA5140A	250p	TDA8732	400p	UPC1188H	350p	2SA884	100p	2SA1237	25p	2SB727	100p	2SC983	120p
TA8607P	320p	TDA1522	110p	TDA3540	200p	TDA5330T	300p	TDA8735	175p	UPC1191	300p	2SA885	35p	2SA1238	30p	2SB733	75p	2SC1000	20p
TA8611AN	250p	TDA1524	200p	TDA3541	175p	TDA5331T	200p	TDA8740	625p	UPC1197	140p	2SA886	45p	2SA1239	30p	2SB734	35p	2SC1001	950p
TA8615N	480p	TDA1526	225p	TDA3560	260p	TDA5332T	150p	TDA8741	550p	UPC1198H	200p	2SA887	20p	2SA1240	45p	2SB737	20p	2SC1008	20p
TA8628N	350p	TDA1534	2000p	TDA3561	300p	TDA5500	400p	TDA8808T	325p	UPC1210	150p	2SA893	15p	2SA1242	80p	2SB739	22p	2SC1010	225p
TA8631	500p	TDA1540	420p	TDA3561A	300p	TDA5600	400p	TDA8809T	350p	UPC1215V	125p	2SA896	25p	2SA1244	120p	2SB744	55p	2SC1012	75p
TA8632N	550p	TDA1541	750p	TDA3562	250p	TDA5660P	250p	TDA9045	400p	UPC1222	130p	2SA899	40p	2SA1245	55p	2SB750	60p	2SC1013	170p
TA8644N	425p	TDA1542	250p	TDA3562TF	300p	TDA5700	200p	TDA9080	550p	UPC1225H	220p	2SA900	45p	2SA1246	80p	2SB753	100p	2SC1014	140p
TA8646	375p	TDA1543	300p	TDA3563	350p	TDA5701	200p	TDA9102C	250p	UPC1227V	225p	2SA904	20p	2SA1248	35p	2SB754	80p	2SC1030	150p
TA8653N	1500p	TDA1552Q	350p	TDA3564	325p	TDA5708	400p	TDA9403	180p	UPC1228HA	45p	2SA907	650p	2SA1249	100p	2SB764	30p	2SC1046	250p
TA8659AN	900p	TDA1553AQ	375p	TDA3565	220p	TDA5709	450p	TDA9500	750p	UPC1230	200p	2SA909	500p	2SA1252	20p	2SB765	70p	2SC1047	20p
TA8690N	700p	TDA1555Q	375p	TDA3566	280p	TDA5800	600p	TDA9503	150p	UPC1237HA	70p	2SA912	70p	2SA1253	30p	2SB772	25p	2SC1050	280p
TA8691N	450p	TDA1557Q	350p	TDA3567	350p	TDA5820	370p	TDA9513	300p	UPC1238	120p	2SA913	100p	2SA1256	30p	2SB774	50p	2SC1051	250p
TA8701AN	275p	TDA1558Q	350p	TDA3569	300p	TDA5832	200p	TDA9800	300p	UPC1241H	150p	2SA914	90p	2SA1257	30p	2SB775	100p	2SC1061	85p
TA8718N	550p	TDA1560Q	675p	TDA3570	375p	TDA5850	175p	TDA9801	250p	UPC1242H	150p	2SA915	30p	2SA1258	70p	2SB776	110p	2SC1069	175p
TA8720	525p	TDA1571	300p	TDA3580	400p	TDA5930	225p	TEA0652	150p	UPC1245V	130p	2SA916	30p	2SA1261	150p	2SB788	35p	2SC1070	65p
TA8739P	450p	TDA1572	175p	TDA3586	750p	TDA6100Q	150p	TEA0653T	80p	UPC1270H	250p	2SA921	40p	2SA1262	110p	2SB791	130p	2SC1079	300p
TA8872N	450p	TDA1574	125p	TDA3590	300p	TDA6101Q	120p	TEA0655	300p	UPC1274V	250p	2SA928A	25p	2SA1263	280p	2SB794	40p	2SC1080	225p
TAA550	25p	TDA1576	170p	TDA3591	360p	TDA6111Q	225p	TEA0665	300p	UPC1277	240p	2SA933	30p	2SA1264	280p	2SB795	45p	2SC1096	40p
TBA120S	40p	TDA1578A	210p	TDA3592A	350p	TDA6200	750p	TEA1002	650p	UPC1278	240p	2SA934	30p	2SA1265	200p	2SB810	15p	2SC1098	120p
TBA396	70p	TDA1579	200p	TDA3601Q	375p	TDA6600-2	700p	TEA1007	120p	UPC1288V	230p	2SA935	40p	2SA1283	50p	2SB816	160p	2SC1106	180p
TBA520	120p	TDA1589	275p	TDA3602	225p	TDA6610-2	1100p	TEA1009	100p	UPC1297CA	325p	2SA937	20p	2SA1284	60p	2SB817	175p	2SC1114	415p
TBA530	100p	TDA1591	275p	TDA3611	450p	TDA6612-2	900p	TEA1015P	110p	UPC1298	320p	2SA939	140p	2SA1286	60p	2SB819	60p	2SC1115	280p
TBA540	90p	TDA1596	200p	TDA3640	350p	TDA7000	170p	TEA1017	280p	UPC1313H A	150p	2SA940	50p	2SA1287	60p	2SB822	40p	2SC1116	290p
TBA560	90p	TDA1598	250p	TDA3645	400p	TDA7010T	120p	TEA1019	130p	UPC1316C	70p	2SA942	60p	2SA1290	150p	2SB824	60p	2SC1124	270p
TBA800	40p	TDA1600	275p	TDA3651	200p	TDA7020T	175p	TEA1024	150p	UPC1318	300p	2SA949	70p	2SA1293	110p	2SB825	135p	2SC1161	110p
TBA810AS	40p	TDA1602A	400p	TDA3652	500p	TDA7021T	200p	TEA1035	200p	UPC1330HA	80p	2SA950	18p	2SA1294	450p	2SB826	75p	2SC1162	30p
TBA820	55p	TDA1670A	230p	TDA3652-TX10	800p	TDA7050	200p	TEA1039	150p	UPC1335V	320p	2SA951	60p	2SA1295	500p	2SB827	200p	2SC1164	600p
TBA820M	35p	TDA1675	250p	TDA3653	80p	TDA7052	120p	TEA1045	300p	UPC1350	115p	2SA952	30p	2SA1301	260p	2SB828	200p	2SC1165	750p
TBA920	100p	TDA1701	300p	TDA3654	90p	TDA7053	200p	TEA1060	225p	UPC1352C	450p	2SA953	60p	2SA1302	300p	2SB829	200p	2SC1166	100p
TBA950	100p	TDA1771	250p	TDA3654Q	85p	TDA7056	200p	TEA1061	175p	UPC1360C	200p	2SA954	30p	2SA1303	400p	2SB835	75p	2SC1170	180p
TBA990	60p	TDA1870A	200p	TDA3710	300p	TDA7057Q	225p	TEA1062	250p	UPC1362C	250p	2SA957	135p	2SA1304	110p	2SB857	80p	2SC1172	150p
TC5020	200p	TDA1872A	275p	TDA3720	175p	TDA7072	175p	TEA1064	250p	UPC1363	190p	2SA958	60p	2SA1305	110p	2SB861	110p	2SC1173	43p
TC5081AP	80p	TDA1904	80p	TDA3724	150p	TDA7077	175p	TEA1067	150p	UPC1363C	300p	2SA963	120p	2SA1307	100p	2SB863	220p	2SC1195	210p
TC5082P	170p	TDA1905	80p	TDA3725	500p	TDA7211	150p	TEA1068	350p	UPC1364C	350p	2SA965	30p	2SA1309	50p	2SB865	25p	2SC1212	35p
TC5090A	230p	TDA1908A	90p	TDA3730	400p	TDA7220	100p	TEA1080P	170p	UPC1365	250p	2SA966	25p	2SA1315	100p	2SB882	180p	2SC1213	10p
TC9125BP	410p	TDA1910	225p	TDA3740	480p	TDA7222	200p	TEA1087	40p	UPC1366C	130p	2SA968	55p	2SA1317	30p	2SB885	45p	2SC1214	15p
TC9130P	150p	TDA1940	180p	TDA3750	400p	TDA7230A	225p	TEA1101	425p	UPC1370C	300p	2SA970	25p	2SA1318	20p	2SB891	35p	2SC1215	25p
TC9134	750p	TDA1941	300p	TDA3755	425p	TDA7231A	80p	TEA1330	65p	UPC1373	85p	2SA979	35p	2SA1319	25p	2SB892	25p	2SC1216	200p
TC9135P	125p	TDA1950	175p	TDA3760	350p	TDA7233	150p	TEA1511	150p	UPC1377C	200p	2SA984	25p	2SA1320	45p	2SB895	60p	2SC1222	15p
TC9137P	500p	TDA2002	50p	TDA3765V	225p	TDA7240	175p	TEA2000	500p	UPC1378	180p	2SA985	60p	2SA1321	80p	2SB908	70p	2SC1226	75p
TC9138AP	150p	TDA2003	85p	TDA3771	460p	TDA7241	250p	TEA2014A	80p	UPC1379C	170p	2SA988	25p	2SA1327	130p	2SB926	30p	2SC1237	250p
TC9142	320p	TDA2004	150p	TDA3780	400p	TDA7245	300p	TEA2018A	110p	UPC1382	110p	2SA991	30p	2SA1329	200p	2SB941	60p	2SC1247A	35p
TC9143	300p	TDA2005	150p	TDA3791	300p	TDA7250	500p	TEA2019	200p	UPC1384	425p	2SA992	30p	2SA1346	20p	2SB950	180p	2SC1252	850p
TC9145	150p	TDA2006	70p	TDA3800	350p	TDA7255	500p	TEA2025B	75p	UPC1387C	250p	2SA993	50p	2SA1348	45p	2SB951	190p	2SC1278	110p
TC9148	200p	TDA2007	120p	TDA3803A	500p	TDA7256	600p	TEA2028	325p	UPC1394	120p	2SA995	60p	2SA1352	100p	2SB953	90p	2SC1279	30p
TC9149	225p	TDA2008	100p	TDA3810	200p	TDA7262	425p	TEA2028B	375p	UPC1397	350p	2SA999	30p	2SA1353	100p	2SB975	100p	2SC1308K	350p
TC9150	425p	TDA2009	160p	TDA3825	225p	TDA7272	170p	TEA2029A	650p	UPC1403CA	650p	2SA1005	25p	2SA1356	100p	2SB985	30p	2SC1312	40p
TC9151P	425p	TDA2010	150p	TDA3827	200p	TDA7273	80p	TEA2029C	270p	UPC1406HA	70p	2SA1006	90p	2SA1357	65p	2SB986	40p	2SC1318	10p
TC9152	425p	TDA2020	120p	TDA3840	300p	TDA7274	60p	TEA2031A	125p	UPC1420CA	450p	2SA1008	125p	2SA1358	130p	2SB1009	110p	2SC1325	400p
TC9153	300p	TDA2030	80p	TDA3842	400p	TDA7275	50p	TEA2032	200p	UPC1421CA	650p	2SA1009	225p	2SA1359	45p	2SB1010	25p	2SC1327	20p
TC9154AP	225p	TDA2030H	100p	TDA3843	200p	TDA7282	50p	TEA2114	200p	UPC1423CA	550p	2SA1010	225p	2SA1360	45p	2SB1012	55p	2SC1328	15p
TC9156	300p	TDA2040	140p	TDA3845	325p	TDA7284	100p	TEA2117	450p	UPC1470	200p	2SA1011	80p	2SA1362	25p	2SB1015	60p	2SC1342	15p
TC9158P	450p	TDA2048	600p	TDA3856	400p	TDA7302	450p	TEA2130	350p	UPC1474HA	75p	2SA1012	85p	2SA1370	50p	2SB1016	130p	2SC1343	200p
TC9162	275p	TDA2051V	450p	TDA3857	350p	TDA7310	800p	TEA2164	160p	UPC1484CA	300p	2SA1013	100p	2SA1371	100p	2SB1017	40p	2SC1345	15p
TC9163	375p	TDA2052V	525p	TDA3950	225p	TDA7313	650p	TEA2260	225p	UPC1488H	115p	2SA1015	10p	2SA1376	30p	2SB1018	130p	2SC1346	100p
TC9164	400p	TDA2054M	110p	TDA4001	325p	TDA7318	550p	TEA2261	185p	UPC1498H	200p	2SA1016	30p	2SA1380	75p	2SB1020	120p	2SC1358	270p
TC9167P	100p	TDA2107	250p	TDA4050	150p	TDA7330A	700p	TEA2262	275p	UPC1505C	400p	2SA1018	100p	2SA1381	100p	2SB1039	65p	2SC1359	15p
TC9172P	300p	TDA2148	350p	TDA4052	500p	TDA7350	650p	TEA3717DP	160p	UPC1513HA	70p	2SA1020	30p	2SA1382	120p	2SB1066	40p	2SC1360	70p
TC9174P	325p	TDA2151	375p	TDA4060	500p	TDA7359	300p	TEA3718S	175p	UPC1514CA	200p	2SA1021	35p	2SA1385	180p	2SB1068	160p	2SC1364	25p
TC9176P	500p	TDA2170	260p	TDA4092	350p	TDA7360	700p	TEA5030	135p	UPC1515CA	250p	2SA1023	60p	2SA1386	400p	2SB1077	180p	2SC1368	75p
TC9177P	225p	TDA2220	200p	TDA4100	225p	TDA7361	175p	TEA5040	650p	UPC1520CA	250p	2SA1026	90p	2SA1387	75p	2SB1098	80p	2SC1382	40p
TCA9940	100p	TDA2270	250p	TDA4173AF	325p	TDA7370V	600p	TEA5101A	175p	UPC1521HA	120p	2SA1029	60p	2SA1396	120p	2SB1099	75p	2SC1383	25p
TCEP100	100p	TDA2320	80p	TDA4180	145p	TDA7374V	600p	TEA5110	175p	UPC1536C	550p	2SA1036	60p	2SA1399	25p	2SB1109	40p	2SC1384	20p
TD62308AP	200p	TDA2501	400p	TDA4190	180p	TDA7770	225p	TEA5114A	200p	2SA329	75p	2SA1037	50p	2SA1400	150p	2SB1123	50p	2SC1393	20p
TD62382	200p	TDA2502	175p	TDA4200	360p	TDA8114	225p	TEA5115	220p	2SA467	40p	2SA1038	40p	2SA1423	30p	2SB1133	50p	2SC1394	15p
TD62506	200p	TDA2503	200p	TDA4210	250p	TDA8115	200p	TEA5116	220p	2SA473	29p	2SA1048	25p	2SA1428	35p	2SB1134	65p	2SC1398	55p
TD62705	250p	TDA2504	200p	TDA4260	250p	TDA8116	350p	TEA5170	200p	2SA483	90p	2SA1051	300p	2SA1441	110p	2SB1135	60p	2SC1399	100p
TD63004P	300p	TDA2505	300p	TDA4282	320p	TDA8120B	550p	TEA5500	325p	2SA484	80p	2SA1052	15p	2SA1442	110p	2SB1140	45p	2SC1400	45p
TD6306P	350p	TDA2506	500p	TDA4282	360p	TDA8124	250p	TEA5501	225p	2SA489	50p	2SA1060	120p	2SA1443	130p	2SB1143	40p	2SC1403	500p
TD6350P	200p	TDA2507	450p	TDA4283T	450p	TDA8134	225p	TEA5550	150p	2SA490	45p	2SA1061	300p	2SA1450	30p	2SB1151	75p	2SC1407	50p
TD6359P	300p	TDA2507T	450p	TDA4290	200p	TDA8135	225p	TEA5560	130p	2SA493	25p	2SA1069	150p	2SA1459	40p	2SB1162	400p	2SC1413	150p
TDA1001	200p	TDA2510	450p	TDA4400	175p	TDA8136	225p	TEA5570	85p	2SA495	40p	2SA1073	375p	2SA1462	25p	2SB1163	370p	2SC1419	50p
TDA1002	200p	TDA2514A	500p	TDA4420	120p	TDA8137	200p	TEA5580	165p	2SA496	30p	2SA1076	230p	2SA1469	100p	2SB1168	50p	2SC1426	700p
TDA1003	150p	TDA2515	450p	TDA4421	300p	TDA8138	200p	TEA5581	200p	2SA505	120p	2SA1077	300p	2SA1475	95p	2SB1182	40p	2SC1429	50p
TDA1005A	175p	TDA2530	450p	TDA4426	170p	TDA8138A	200p	TEA5591	200p	2SA509	35p	2SA1080	125p	2SA1488	150p	2SB1185	50p	2SC1431	400p
TDA1010A	80p	TDA2532	120p	TDA4427	200p	TDA8138B	200p	TEA5620	300p	2SA537	170p	2SA1081	80p	2SA1489	300p	2SB1202	45p	2SC1444	275p
TDA1011	75p	TDA2540	150p	TDA4430	150p	TDA8139	200p	TEA5630	225p	2SA539	20p	2SA1082	80p	2SA1490	225p	2SB1203	45p	2SC1445	350p
TDA1012	120p	TDA2541	70p	TDA4433	150p	TDA8140	200p	TEA5640E	750p	2SA544	650p	2SA1083	20p	2SA1491	300p	2SB1204	45p	2SC1446	55p
TDA1013A	110p	TDA2542	110p	TDA4437	300p	TDA8143	160p	TEA5701	650p	2SA550	150p	2SA1084	100p	2SA1492	260p	2SB1205	40p	2SC1447	70p
TDA1015	85p	TDA2543	210p	TDA4439	220p	TDA8145	120p	TEA6000	400p	2SA562	30p	2SA1085	75p	2SA1493	500p	2SB1223	60p	2SC1449	120p
TDA1016	140p	TDA2544	200p	TDA4440	180p	TDA8146	200p	TEA6100	350p	2SA564	15p	2SA1091	100p	2SA1494	450p	2SB1243	40p	2SC1450	200p
TDA1020	110p	TDA2545	120p	TDA4442	240p	TDA8160	125p	TEA6200	225p	2SA571	650p	2SA1093	180p	2SA1516	280p	2SB1274	40p	2SC1454	250p
TDA1022	330p	TDA2546A	200p	TDA4443	250p	TDA8170	170p	TEA6300	500p	2SA603	100p	2SA1094	190p	2SA1519	20p	2SB1282	300p	2SC1470	120p
TDA1023	130p	TDA2548	200p	TDA4445	220p	TDA8172	250p	TEA6310T	425p	2SA606	200p	2SA1095	300p	2SA1523	45p	2SB1318	40p	2SC1472	40p
TDA1024	150p	TDA2549	300p	TDA4450	225p	TDA8173	280p	TEA6414A	425p	2SA608	15p	2SA1096	80p	2SA1535	175p	2SB1375	45p	2SC1473	15p
TDA1025	320p	TDA2555	175p	TDA4451	250p	TDA8174	300p	TEA6415B	525p	2SA614	150p	2SA1102	130p	2SA1538	55p	2SB1382	350p	2SC1474	45p
TDA1028	175p	TDA2556	230p	TDA4453	275p	TDA8175	300p	TEA6420	360p	2SA628	20p	2SA1103	130p	2SA1540	50p	2SB1468	100p	2SC1501	70p
TDA1029	200p	TDA2557	225p	TDA4480	280p	TDA8178	400p	TEA8172	125p	2SA634	50p	2SA1104	140p	2SA1598	220p	2SC182	75p	2SC1505	55p
TDA1035	160p	TDA2558	500p	TDA4481	350p	TDA8179S	750p	TL431	45p	2SA636	50p	2SA1105	250p	2SA1599	220p	2SC372	25p	2SC1507	45p
TDA1038	500p	TDA2574V	350p	TDA4482	350p	TDA8185	300p	TL494	100p	2SA639	60p	2SA1106	160p	2SA1600	250p	2SC380	10p	2SC1509	35p
TDA1041E	250p	TDA2575A	100p	TDA4500	300p	TDA8190	200p	TL061	40p	2SA640	60p	2SA1111	90p	2SA1601	200p	2SC388A	60p	2SC1514	35p
TDA1041P	180p	TDA2577A	200p	TDA4501	280p	TDA8191	425p	TL064	80p	2SA642	50p	2SA1112	150p	2SA1625	40p	2SC394	60p	2SC1515	60p
TDA1044	110p	TDA2578A	200p	TDA4502	550p	TDA8192	275p	TL071	38p	2SA643	25p	2SA1115	30p	2SA1626	90p	2SC403	25p	2SC1520	45p
TDA1047	200p	TDA2579A	210p	TDA4503	300p	TDA8196	150p	TL074	80p	2SA673	15p	2SA1120	40p	2SA1640	100p	2SC454	15p	2SC1541	110p
TDA1048	200p	TDA2582	130p	TDA4505A	300p	TDA8205	1250p	TL083	55p	2SA677	35p	2SA1123	40p	2SA1652	70p	2SC458	10p	2SC1545	120p
TDA1053	300p	TDA2590	170p	TDA4505E	275p	TDA8213	275p	TL084	70p	2SA678	25p	2SA1124	60p	2SA1667	175p	2SC460	10p	2SC1567	40p
TDA1054	180p	TDA2591	110p	TDA4505K	450p	TDA8214B	225p	TMP47C-434N	1250p	2SA683	25p	2SA1127	50p	2SA1668	180p	2SC461	15p	2SC1568	35p
TDA1057	60p	TDA2591Q	150p	TDA4505M	500p	TDA8215H	300p	TPU2732	1200p	2SA684	25p	2SA1133	120p	2SA1671	310p	2SC495	45p	2SC1569	55p
TDA1059B	40p	TDA2593	110p	TDA4510	270p	TDA8217	225p	TPU2735	900p	2SA699	100p	2SA1135	130p	2SA1673	425p	2SC496	25p	2SC1570	40p
TDA1060	140p	TDA2594	300p	TDA4532	200p	TDA8303	350p	UC3524	100p	2SA705	70p	2SA1141	200p	2SA1680	40p	2SC497	85p	2SC1571	50p
TDA1062	140p	TDA2595	200p	TDA4555	400p	TDA8304	600p	UC3842N	80p	2SA706	140p	2SA1142	100p	2SA1706	25p	2SC515	100p	2SC1573	25p
TDA1068	75p	TDA2600	400p	TDA4556	370p	TDA8305	500p	UC3843	125p	2SA708	50p	2SA1143	15p	SB175	45p	2SC535	30p	2SC1576	550p
TDA1072	150p	TDA2611A	100p	TDA4557	450p	TDA8340	200p	UC3844	70p	2SA711	280p	2SA1145	40p	2SB324	40p	2SC536	20p	2SC1580	600p
TDA1074	280p	TDA2616	250p	TDA4560	270p	TDA8341	250p	UPC20C	220p	2SA715	50p	2SA1146	200p	2SB337	150p	2SC605	100p	2SC1583	25p
TDA1077	250p	TDA2630	300p	TDA4565	200p	TDA8349A	350p	UPC554	130p	2SA719	50p	2SA1151	30p	2SB474	250p	2SC619	100p	2SC1586	540p
TDA1082	275p	TDA2640	350p	TDA4566	325p	TDA7350Q	275p	UPC555	60p	2SA720	20p	2SA1152	150p	2SB492	80p	2SC641	80p	2SC1617	340p
TDA1083	95p	TDA2653A	225p	TDA4568	225p	TDA8351	225p	UPC556H	80p	2SA725	80p	2SA1153	30p	2SB511	55p	2SC644	10p	2SC1619	170p
TDA1085	170p	TDA2654	200p	TDA4570	300p	TDA8360N3	800p	UPC571	220p	2SA726	20p	2SA1154	22p	2SB525	65p	2SC647	300p	2SC1623	50p
TDA1087	60p	TDA2658	300p	TDA4580	650p	TDA8361N3	900p	UPC574	60p	2SA733	15p	2SA1156	90p	2SB527	130p	2SC681	250p	2SC1624	60p
TDA1092	100p	TDA2670	150p	TDA4600	200p	TDA8362AN	1200p	UPC575C2	90p	2SA740	90p	2SA1162	30p	2SB531	400p	2SC683	35p	2SC1626	55p
TDA1097	475p	TDA2690	100p	TDA4600II	160p	TDA8362N3	1200p	UPC577	64p	2SA742	450p	2SA1163	15p	2SB536	80p	2SC708	100p	2SC1627	15p
TDA1151	40p	TDA2710-1	400p	TDA4601	120p	TDA8366N2	1500p	UPC592	95p	2SA747A	425p	2SA1169	500p	2SB537	90p	2SC710	15p	2SC1628	75p
TDA1154	50p	TDA2721	200p	TDA4605	220p	TDA8372A	450p	UPC595	190p	2SA748	60p	2SA1170	500p	2SB546	22p	2SC711	15p	2SC1634	50p
TDA1170	85p	TDA2730	200p	TDA4610	370p	TDA8380	200p	UPC596	190p	2SA764	200p	2SA1173	60p	2SB546	45p	2SC730	350p	2SC1667

JAPANESE TRANSISTORS

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
2SC1675	90p	2SC2258	30p	2SC2710	50p	2SC3244	45p	2SC3781	150p	2SD287	250p	2SD879	60p	2SD1311	65p	2SD1756	275p	2SK240	140p
2SC1678	80p	2SC2259	60p	2SC2712	20p	2SC3246	50p	2SC3782	75p	2SD291	250p	2SD880	40p	2SD1313	1000p	2SD1758	75p	2SK241	30p
2SC1683	100p	2SC2261	700p	2SC2714	20p	2SC3259	350p	2SC3783	300p	2SD313	25p	2SD882	25p	2SD1326	200p	2SD1760	80p	2SK246	30p
2SC1684	30p	2SC2267	90p	2SC2716	50p	2SC3260	220p	2SC3787	100p	2SD315	75p	2SD889	35p	2SD1327	150p	2SD1761	60p	2SK300	25p
2SC1685	30p	2SC2270	60p	2SC2719	25p	2SC3261	230p	2SC3788	60p	2SD325	30p	2SD892A	75p	2SD1328	60p	2SD1762	50p	2SK301	40p
2SC1729	900p	2SC2271	25p	2SC2721	120p	2SC3262	280p	2SC3789	75p	2SD330	65p	2SD894	35p	2SD1330	50p	2SD1763A	60p	2SK303	40p
2SC1730	10p	2SC2274	15p	2SC2724	15p	2SC3263	280p	2SC3790	120p	2SD348	300p	2SD895	100p	2SD1347	70p	2SD1764	70p	2SK304	25p
2SC1735	70p	2SC2275	50p	2SC2738	200p	2SC3264	390p	2SC3795	140p	2SD350	320p	2SD896	200p	2SD1348	65p	2SD1765	70p	2SK312	750p
2SC1740	10p	2SC2278	70p	2SC2749	350p	2SC3269	50p	2SC3798	220p	2SD357	40p	2SD898B	225p	2SD1350	150p	2SD1769	110p	2SK315	70p
2SC1741	35p	2SC2283	700p	2SC2750	300p	2SC3270	50p	2SC3807	120p	2SD358	40p	2SD900	400p	2SD1376	60p	2SD1773	160p	2SK320	120p
2SC1755	90p	2SC2290	1800p	2SC2751	270p	2SC3271	75p	2SC3808	70p	2SD359	50p	2SD905	450p	2SD1378	60p	2SD1776	70p	2SK323	130p
2SC1756	35p	2SC2291	40p	2SC2752	75p	2SC3277	280p	2SC3811	80p	2SD361	100p	2SD916	130p	2SD1379	100p	2SD1783	100p	2SK332	175p
2SC1758	30p	2SC2298	35p	2SC2767	300p	2SC3279	30p	2SC3831	250p	2SD362	100p	2SD917	300p	2SD1380	100p	2SD1785	160p	2SK359	40p
2SC1760	70p	2SC2307	300p	2SC2769	400p	2SC3280	200p	2SC3832	135p	2SD371	240p	2SD921	320p	2SD1382	60p	2SD1789	210p	2SK363	50p
2SC1775	10p	2SC2308	10p	2SC2773	700p	2SC3281	200p	2SC3833	250p	2SD380	650p	2SD923	360p	2SD1384	50p	2SD1796	180p	2SK364	40p
2SC1781	20p	2SC2312	300p	2SC2774	500p	2SC3284	600p	2SC3851	100p	2SD381	50p	2SD946	120p	2SD1390	350p	2SD1802	75p	2SK367	40p
2SC1789	100p	2SC2314	70p	2SC2785	40p	2SC3293	85p	2SC3852	80p	2SD382	75p	2SD947	100p	2SD1391	250p	2SD1806	75p	2SK369	30p
2SC1809	40p	2SC2316	150p	2SC2786	20p	2SC3298	50p	2SC3853	220p	2SD386	70p	2SD950	300p	2SD1392	85p	2SD1812	60p	2SK373	40p
2SC1810	250p	2SC2320	10p	2SC2787	10p	2SC3299	120p	2SC3855	220p	2SD388	150p	2SD951	200p	2SD1395	80p	2SD1815	100p	2SK374	45p
2SC1815	10p	2SC2324	120p	2SC2791	500p	2SC3300	400p	2SC3857	500p	2SD389	60p	2SD957A	520p	2SD1396	120p	2SD1825	60p	2SK386	600p
2SC1819	70p	2SC2328A	50p	2SC2792	220p	2SC3303	100p	2SC3858	550p	2SD400	14p	2SD958	60p	2SD1397	100p	2SD1827	120p	2SK389	115p
2SC1826	60p	2SC2310	25p	2SC2793	700p	2SC3306	130p	2SC3866	275p	2SD401	50p	2SD965	35p	2SD1398	120p	2SD1843	100p	2SK400	700p
2SC1827	60p	2SC2315	175p	2SC2808	40p	2SC3307	600p	2SC3868	100p	2SD402	120p	2SD970	170p	2SD1399	300p	2SD1846	350p	2SK405	450p
2SC1829	500p	2SC2329	480p	2SC2810	360p	2SC3309	150p	2SC3870	200p	2SD414	45p	2SD972	40p	2SD1400	280p	2SD1847	350p	2SK414	550p
2SC1833	27p	2SC2230	300p	2SC2812	40p	2SC3310	125p	2SC3883	210p	2SD415	55p	2SD973	60p	2SD1402	120p	2SD1849	280p	2SK415	500p
2SC1834	50p	2SC2331	50p	2SC2814	40p	2SC3316	280p	2SC3884A	200p	2SD424	350p	2SD973A	70p	2SD1403	225p	2SD1850	325p	2SK423	75p
2SC1841	12p	2SC2333	200p	2SC2824	75p	2SC3317	350p	2SC3885	250p	2SD426	150p	2SD982	90p	2SD1405	80p	2SD1853	40p	2SK427	50p
2SC1844	50p	2SC2334	80p	2SC2825	900p	2SC3326	50p	2SC3885A	290p	2SD427	350p	2SD985	120p	2SD1406	60p	2SD1856	40p	2SK430	200p
2SC1845	15p	2SC2335	55p	2SC2826	200p	2SC3327	60p	2SC3886A	330p	2SD438	35p	2SD986	120p	2SD1407	60p	2SD1857	75p	2SK511	450p
2SC1846	35p	2SC2336A	125p	2SC2827	130p	2SC3328	50p	2SC3890	150p	2SD467	15p	2SD998	70p	2SD1408	125p	2SD1858	40p	2SK513	325p
2SC1847	45p	2SC2344	150p	2SC2832	300p	2SC3330	20p	2SC3892A	400p	2SD468	15p	2SD1010	40p	2SD1409	170p	2SD1863	35p	2SK526	160p
2SC1855	85p	2SC2347	35p	2SC2834	280p	2SC3331	25p	2SC3893	225p	2SD471	20p	2SD1012	40p	2SD1411	85p	2SD1864	85p	2SK531	350p
2SC1856	25p	2SC2353	120p	2SC2837	250p	2SC3333	120p	2SC3895	400p	2SD476	100p	2SD1020	40p	2SD1412	75p	2SD1877	175p	2SK534	700p
2SC1865	700p	2SC2360	120p	2SC2839	40p	2SC3345	100p	2SC3896	400p	2SD525	50p	2SD1021	120p	2SD1413	60p	2SD1878	160p	2SK537	900p
2SC1870	700p	2SC2361	150p	2SC2853	70p	2SC3346	130p	2SC3897	400p	2SD526	70p	2SD1022	250p	2SD1415	190p	2SD1879	275p	2SK538	350p
2SC1871	425p	2SC2362	50p	2SC2873	60p	2SC3352	200p	2SC3907	250p	2SD545	18p	2SD1024	850p	2SD1417	125p	2SD1880	360p	2SK539	1100p
2SC1875	220p	2SC2365	280p	2SC2877	120p	2SC3353	280p	2SC3927	250p	2SD549	120p	2SD1027	850p	2SD1425	260p	2SD1881	350p	2SK544	30p
2SC1881	70p	2SC2369	100p	2SC2878	20p	2SC3355	50p	2SC3940	40p	2SD551	300p	2SD1030	75p	2SD1426	135p	2SD1884	300p	2SK552	250p
2SC1890	15p	2SC2371	25p	2SC2879	3200p	2SC3356	120p	2SC3943	75p	2SD554	225p	2SD1031	70p	2SD1427	160p	2SD1886	450p	2SK553	225p
2SC1895	500p	2SC2373	210p	2SC2882	60p	2SC3358	50p	2SC3944	80p	2SD555	500p	2SD1036	600p	2SD1428	180p	2SD1887	300p	2SK555	320p
2SC1904	125p	2SC2383	50p	2SC2883	60p	2SC3376	300p	2SC3950	120p	2SD556	225p	2SD1046	200p	2SD1430	280p	2SD1894	300p	2SK556	500p
2SC1906	15p	2SC2389	45p	2SC2898	200p	2SC3377	50p	2SC3953	60p	2SD558	200p	2SD1047	180p	2SD1431	200p	2SD1895	225p	2SK557	400p
2SC1907	20p	2SC2407	110p	2SC2899	50p	2SC3378	120p	2SC3955	70p	2SD560	50p	2SD1051	130p	2SD1432	400p	2SD1910	280p	2SK559	600p
2SC1909	250p	2SC2408	120p	2SC2909	60p	2SC3379	1200p	2SC3964	100p	2SD571	20p	2SD1055	60p	2SD1433	400p	2SD1911	300p	2SK560	580p
2SC1913	90p	2SC2412K	50p	2SC2910	25p	2SC3381	130p	2SC3972	250p	2SD575	530p	2SD1060	130p	2SD1438	100p	2SD1913	50p	2SK566	475p
2SC1914	30p	2SC2440	200p	2SC2911	80p	2SC3383	80p	2SC3973	210p	2SD592	25p	2SD1062	150p	2SD1439	165p	2SD1929	50p	2SK606	70p
2SC1921	15p	2SC2458	10p	2SC2912	120p	2SC3393	80p	2SC3975	210p	2SD596	25p	2SD1063	200p	2SD1441	220p	2SD1930	50p	2SK612	80p
2SC1922	175p	2SC2459	50p	2SC2921	650p	2SC3397	20p	2SC3987	220p	2SD600	30p	2SD1064	250p	2SD1442	80p	2SD1933	75p	2SK684	950p
2SC1923	10p	2SC2466	55p	2SC2922	480p	2SC3399	50p	2SC3996	600p	2SD601	40p	2SD1065	160p	2SD1445	200p	2SD1939	75p	2SK685	1150p
2SC1929	180p	2SC2486	275p	2SC2923	75p	2SC3400	35p	2SC3997	1400p	2SD602	60p	2SD1069	150p	2SD1446	300p	2SD1941	500p	2SK699	100p
2SC1940	110p	2SC2492	50p	2SC2928	550p	2SC3401	50p	2SC3998	1000p	2SD612	50p	2SD1073	350p	2SD1450	60p	2SD1944	50p	2SK719	300p
2SC1941	27p	2SC2470	65p	2SC2929	280p	2SC3402	40p	2SC4006	100p	2SD613	70p	2SD1088	150p	2SD1451	200p	2SD1958	80p	2SK724	500p
2SC1942	350p	2SC2481	120p	2SC2934	75p	2SC3405	130p	2SC4020	280p	2SD617	300p	2SD1094	375p	2SD1452	275p	2SD1959	210p	2SK725	550p
2SC1944	350p	2SC2482	20p	2SC2937	250p	2SC3409	400p	2SC4023	325p	2SD633	70p	2SD1110	225p	2SD1453	140p	2SD1978	50p	2SK726	425p
2SC1945	350p	2SC2483	120p	2SC2939	400p	2SC3416	30p	2SC4029	350p	2SD636	10p	2SD1111	20p	2SD1455	250p	2SD1984	450p	2SK727	475p
2SC1946	1500p	2SC2484	185p	2SC2944	300p	2SC3417	90p	2SC4043	45p	2SD637	15p	2SD1113	225p	2SD1457	165p	2SD1991	50p	2SK739	400p
2SC1947	450p	2SC2485	400p	2SC2958	50p	2SC3419	120p	2SC4046	40p	2SD638	15p	2SD1128	200p	2SD1458	50p	2SD1994	300p	2SK758	300p
2SC1953	45p	2SC2491	200p	2SC2962	800p	2SC3420	80p	2SC4056	350p	2SD639	20p	2SD1133	65p	2SD1459	80p	2SD1996	45p	2SK769	500p
2SC1957	70p	2SC2498	50p	2SC2979	160p	2SC3421	45p	2SC4059	550p	2SD640	350p	2SD1135	75p	2SD1468	40p	2SD2006	75p	2SK786	200p
2SC1959	10p	2SC2500	25p	2SC2987	250p	2SC3422	75p	2SC4064	140p	2SD655	18p	2SD1138	40p	2SD1487	225p	2SD2010	250p	2SK787	800p
2SC1962	175p	2SC2502	140p	2SC2988	150p	2SC3423	60p	2SC4106	200p	2SD661	60p	2SD1140	40p	2SD1494	200p	2SD2011	60p	2SK791	225p
2SC1967	1300p	2SC2503	600p	2SC2995	60p	2SC3425	65p	2SC4107	175p	2SD666	25p	2SD1142	350p	2SD1496	300p	2SD2012	50p	2SK792	300p
2SC1969	160p	2SC2512	20p	2SC2999	50p	2SC3446	150p	2SC4124	250p	2SD667	20p	2SD1145	25p	2SD1497	230p	2SD2018	65p	2SK793	300p
2SC1970	100p	2SC2517	120p	2SC3001	1400p	2SC3447	130p	2SC4125	400p	2SD669	35p	2SD1148	175p	2SD1497-02	350p	2SD2033	80p	2SK794	315p
2SC1971	400p	2SC2519	60p	2SC3019	320p	2SC3456	200p	2SC4137	40p	2SD673	350p	2SD1153	30p	2SD1505	90p	2SD2061	100p	2SK796	600p
2SC1972	600p	2SC2527	300p	2SC3020	1450p	2SC3457	125p	2SC4138	200p	2SD676	250p	2SD1159	65p	2SD1506	50p	2SD2066	250p	2SK809	850p
2SC1973	150p	2SC2534	150p	2SC3022	1850p	2SC3459	180p	2SC4157	400p	2SD717	180p	2SD1160	150p	2SD1508	60p	2SD2125	180p	2SK812	150p
2SC1975	120p	2SC2535	300p	2SC3025	500p	2SC3460	130p	2SC4159	100p	2SD718	85p	2SD1163A	220p	2SD1509	100p	2SD2136	85p	2SK817	325p
2SC1980	30p	2SC2538	100p	2SC3026	550p	2SC3461	275p	2SC4161	125p	2SD722	240p	2SD1164	75p	2SD1511	100p	2SD2144	35p	2SK851	550p
2SC1983	75p	2SC2540	1900p	2SC3030	300p	2SC3466	225p	2SC4169	60p	2SD725	200p	2SD1168	270p	2SD1519	250p	2SD2151	175p	2SK872	650p
2SC1984	150p	2SC2542	300p	2SC3037	125p	2SC3468	70p	2SC4199	700p	2SD726	275p	2SD1169	280p	2SD1521	70p	2SD2255	175p	2SK875	475p
2SC1985	100p	2SC2545	55p	2SC3038	125p	2SC3481	300p	2SC4204	60p	2SD731	250p	2SD1173	350p	2SD1525	600p	2SD2331	250p	2SK903	500p
2SC1986	100p	2SC2546	25p	2SC3039	80p	2SC3482	275p	2SC4231	250p	2SD732	250p	2SD1185	280p	2SD1526	100p	2SD2333	200p	2SK904	500p
2SC2001	15p	2SC2547	65p	2SC3040	260p	2SC3486	275p	2SC4235	550p	2SD734	15p	2SD1186	400p	26D1541	350p	2SD2340	225p	2SK951	275p
2SC2002	15p	2SC2550	50p	2SC3042	300p	2SC3502	50p	2SC4236	550p	2SD741	120p	2SD1189	55p	2SD1545	275p	2SJ48	425p	2SK952	275p
2SC2003	20p	2SC2551	70p	2SC3052	30p	2SC3503	50p	2SC4237	650p	2SD743	130p	2SD1191	120p	2SD1546	350p	2SJ56	700p	2SK955	750p
2SC2004	20p	2SC2552	60p	2SC3057	150p	2SC3504	120p	2SC4242	120p	2SD757	120p	2SD1192	90p	2SD1548	400p	2SJ74	60p	2SK956	600p
2SC2022	110p	2SC2553	200p	2SC3068	60p	2SC3505	240p	2SC4278	175p	2SD760	70p	2SD1196	150p	2SD1554	170p	2SJ76	220p	2SK962	700p
2SC2023	180p	2SC2555	120p	2SC3070	35p	2SC3506	250p	2SC4288A	650p	2SD762	100p	2SD1197	150p	2SD1555	170p	2SJ77	350p	2SK1023	550p
2SC2026	30p	2SC2562	90p	2SC3071	25p	2SC3507	650p	2SC4300	200p	2SD763	140p	2SD1198	60p	2SD1556	300p	2SJ79	225p	2SK1036	450p
2SC2027	200p	2SC2563	200p	2SC3073	100p	2SC3509	750p	2SC4301	550p	2SD768	180p	2SD1207	40p	2SD1565	75p	2SJ103	75p	2SK1057	600p
2SC2036	50p	2SC2568	120p	2SC3074	200p	2SC3514	170p	2SC4304	225p	2SD772	200p	2SD1210	280p	2SD1571	170p	2SJ109	200p	2SK1058	800p
2SC2037	50p	2SC2570	30p	2SC3075	150p	2SC3518	120p	2SC4313	1000p	2SD773	20p	2SD1211	120p	2SD1572	100p	2SJ113	1050p	2SK1081	700p
2SC2053	120p	2SC2571	350p	2SC3077	120p	2SC3519	250p	2SC4381	225p	2SD774	30p	2SD1213	220p	2SD1575	200p	2SJ114	1150p	2SK1082	450p
2SC2055	150p	2SC2577	110p	2SC3086	150p	2SC3526	45p	2SC4382	300p	2SD777	400p	2SD1218	75p	2SD1576	200p	2SJ116	1200p	2SK1102	375p
2SC2058	20p	2SC2578	170p	2SC3089	130p	2SC3528	750p	2SC4386	275p	2SD784	650p	2SD1223	75p	2SD1577	250p	2SJ117	550p	2SK1117	250p
2SC2060	40p	2SC2579	110p	2SC3101	750p	2SC3531	225p	2SC4387	425p	2SD786	100p	2SD1225	70p	2SD1579	120p	2SJ119	700p	2SK1118	225p
2SC2061	75p	2SC2580	175p	2SC3112	35p	2SC3549	200p	2SC4408	50p	2SD787	20p	2SD1227	40p	2SD1589	60p	2SJ162	680p	2SK1120	550p
2SC2068	60p	2SC2581	225p	2SC3114	40p	2SC3552	270p	2SC4429	275p	2SD788	30p	2SD1229	250p	2SD1590	100p	2SJ175	200p	2SK1190	350p
2SC2071	140p	2SC2588	600p	2SC3116	75p	2SC3568	200p	2SC4431	90p	2SD789	20p	2SD1237	300p	2SD1591	310p	2SJ182	150p	2SK1191	800p
2SC2073	40p	2SC2590	40p	2SC3117	120p	2SC3577	275p	2SC4467	175p	2SD792	400p	2SD1238	300p	2SD1593	125p	2SJ200	625p	2SK1217	700p
2SC2075	60p	2SC2591	50p	2SC3122	50p	2SC3584	200p	2SC4468	250p	2SD794	33p	2SD1244	25p	2SD1595	100p	2SJ307	175p	2SK1221	200p
2SC2078	95p	2SC2592	200p	2SC3148	145p	2SC3591	200p	2SC4517	250p	2SD795A	140p	2SD1246	20p	2SD1608	210p	2SK19	45p	2SK1275	275p
2SC2085	100p	2SC2603	10p	2SC3149	180p	2SC3595	220p	2SC4517A	300p	2SD798	175p	2SD1247	40p	2SD1609	45p	2SK33	40p	2SK1296	350p
2SC2086	60p	2SC2610	60p	2SC3150	100p	2SC3597	75p	2SC4531	450p	2SD799	150p	2SD1251	180p	2SD1632	400p	2SK40	50p	2SK1299	450p
2SC2092	100p	2SC2611	30p	2SC3151	175p	2SC3599	140p	2SC4532	1400p	2SD809	45p	2SD1254	55p	2SD1637	50p	2SK55	100p	2SK1317	900p
2SC2094	1200p	2SC2621	70p	2SC3152	130p	2SC3600	175p	2SC4542	500p	2SD811	450p	2SD1263	90p	2SD1647	40p	2SK68	100p	2SK1338	250p
2SC2097	2300p	2SC2625	190p	2SC3153	175p	2SC3606	100p	2SC4742	275p	2SD819	300p	2SD1264	55p	2SD1649	260p	2SK73	75p	2SK1341	500p
2SC2099	2500p	2SC2626	600p	2SC3156	350p	2SC3607	150p	2SC4744	350p	2SD820	250p	2SD1265	75p	2SD1650	150p	2SK97	200p	2SK1342	500p
2SC2118	1100p	2SC2630	1800p	2SC3157	200p	2SC3608	65p	2SC4745	675p	2SD821	550p	2SD1266	180p	2SD1651	150p	2SK106	40p	2SK1350	200p
2SC2120	10p	2SC2631	20p	2SC3158	260p	2SC3616	45p	2SC4747	375p	2SD822	290p	2SD1267	55p	2SD1656	250p	2SK107	40p	2SK1356	225p
2SC2122A	300p	2SC2632	35p	2SC3159	200p	2SC3636	280p	2SC4762	350p	2SD826	30p	2SD1271	55p	2SD1663	350p	2SK109	150p	2SK1357	350p
2SC2131	550p	2SC2634	10p	2SC3164	270p	2SC3642	225p	2SC4769	300p	2SD829	375p	2SD1271A	225p	2SD1666	60p	2SK117	50p	2SK1358	400p
2SC2141	60p	2SC2636	40p	2SC3169	150p	2SC3657	400p	2SC4770	250p	2SD836	50p	2SD1272	200p	2SD1667	120p	2SK118	50p	2SK1377	150p
2SC2153	40p	2SC2637	120p	2SC3170	300p	2SC3659	600p	2SC4820	225p	2SD836A	50p	2SD1273	50p	2SD1668	120p	2SK125	100p	2SK1400	250p
2SC2166	80p	2SC2640	1800p	2SC3173	180p	2SC3668	120p	2SC4826	70p	2SD837	55p	2SD1274	80p	2SD1669	85p	2SK133	650p	2SK1404	290p
2SC2168	120p	2SC2653	100p	2SC3175	150p	2SC3675	100p	2SC4924	300p	2SD838	500p	2SD1275	50p	2SD1677	300p	2SK147	160p	2SK1461	220p
2SC2188	70p	2SC2654	180p	2SC3178	125p	2SC3678	280p	2SC4927	500p	2SD841	110p	2SD1276	60p	2SD1680	225p	2SK152	40p	2SK1462	425p
2SC2200	250p	2SC2655	75p	2SC3179	70p	2SC3679	140p	2SC5002	450p	2SD844	200p	2SD1277	190p	2SD1683	45p	2SK161	30p	2SK1487	250p
2SC2209	50p	2SC2656	550p	2SC3180	175p	2SC3680	380p	2SC5003	350p	2SD850	170p	2SD1279	600p	2SD1684	70p	2SK163	40p	2SK1507	475p
2SC2216	50p	2SC2660	100p	2SC3181	200p	2SC3685	450p	2SC5044	250p	2SD856	48p	2SD1288	175p	2SD1706	325p	2SK168	40p	2SK1529	700p
2SC2221	650p	2SC2665	200p	2SC3182	120p	2SC3687	300p	2SC5129	500p	2SD858	250p	2SD1289	250p	2SD1707	400p	2SK170	50p	2SK1537	400p
2SC2228A	60p	2SC2668	10p	2SC3198	30p	2SC3688	550p	2SC5149	400p	2SD863	23p	2SD1291	280p	2SD1708	375p	2SK184	35p	2SK1544	900p
2SC2229	15p	2SC2671	100p	2SC3199	40p	2SC3692	150p	2SD188	350p	2SD864	200p	2SD1292	60p	2SD1710	200p	2SK192	45p	2SK1767	275p
2SC2230	80p	2SC2681	170p	2SC3202	25p	2SC3715	480p	2SD198	140p	2SD866	120p	2SD1293	70p	2SD1718	275p	2SK193	40p	2SK2038	295p
2SC2233	100p	2SC2682	70p	2SC3209	120p	2SC3717	120p	2SD199	195p	2SD866A	140p	2SD1297	300p	2SD1729	230p	2SK195	150p	2SK2039	750p
2SC2235	60p	2SC2688	27p	2SC3210	550p	2SC3729	450p	2SD200	180p	2SD867	350p	2SD1302	20p	2SD1730	275p	2SK197	140p	2SK2134	300p
2SC2236	20p	2SC2690	60p	2SC3211	220p	2SC3746	100p	2SD201	260p	2SD868	260p	2SD1306	45p	2SD1732	325p	2SK212	35p		
2SC2237	540p	2SC2694	3500p	2SC3212	260p	2SC3747	120p	2SD213	250p	2SD869	150p	2SD1308	80p	2SD1739	225p	2SK214	170p		
2SC2238	45p	2SC2705	50p	2SC3225	50p	2SC3748	100p	2SD234	90p	2SD870	140p	2SD1309	140p	2SD1740	125p	2SK216	200p		
2SC2240	15p	2SC2706	250p	2SC3242	30p	2SC3752	250p	2SD257	195p	2SD871	260p	2SD1310	140p	2SD1748	90p	2SK223	50p		

REPLACEMENT VIDEO HEADS

Model	Price
AKAI	
VS105, 112, 115, 116, 120, 125, 126, 201, 202, 205, 220, 240, 244, 245, 247, 248, 250, 301, 303, 304, VSP8,	
VSP82	1000p
VP7100, VS9300, VS9500	650p
VP7200, VS9700, VS9800	1200p
VS1	1250p
VS2	1200p
VS3	1350p
VS10	1350p
VSP1	2100p
VS33,35, 37, 38, 38EOG MKII, 53, 55, 66, 765, 766, 767, 768, 865, 867,	
VSF30, 33, 4, 400, 410, 420, 430, 440, 441, 450, 455, 480, 490, 497,	
VSG51, 54, 55, VXS450,	
VXS470	2250p
VS512, VS515, VS516	2250p
VS462, 465, 467, 467EOG2, VSF12, 15EK, 15EOH, 300, 301, 310,	
VSF320, 330, 340, 350, VSG30, 33, 34, 35	2300p
VS11, VS12	1200p
VS6, VS8, VS9	2400p
VSX9	2250p
VSA1100, 1110, 650, VSF500, 510, 550, 560, 580, 590, 600, 650,	
VSG60, 64, 65, VSG70, 73, 74, 75, VSX560, 580	3600p
VS155, VS165	2300p
VS20, 22, 23, 24, 25, 26, 27, 422, 425, 426, 427, 485, VSF10, 11, 180, 190	
VSF200, 210, 220, 221, 222, 230, 240, 260, 281, 262, 265, 270, 275, 280,	
VSF290, 510, 550, VSG20, 204, 205, 206, VSG21, 211, 212, 215,	
VSG217EOG , 23, 24, 25, 405, 411, 415, 417, VSP 100, 100EM, 110,	
VSP88, 88KC, 8111, VSP9, VSR100, 100EDG, 100EM, 110, VSX400	1250p
VSR9	1300p
VS 109, VS603, VS606, VS607	2500p
VS75	2500p
VS965, VC967	3450p
VSF400, 410, 420, 430, 440, 441, 450, 455, 480, 490, 497, VSX450, 470	2850p
VSG20, 204, 204, 205, 206, 20, 21, 211, 212, 215, 217, 225, 23, 24, 25,	
VSP100, 110, 88, VSR100, 110, VSX400	1950p
VSG415, VSG415EA, VSG425	2800p
VS75, VSA77	3500p
VSF1000, VSF1010, VSF1030	5800p
ALBA	
VDR3000, VCR4000, VCR5000, VCR6000	1650p
VTV10	1000p
VCR7000, 7800, 8000, 8800	1100p
AMSTRAD	
VCR4500, VCR5200, VCR9000, TVR1	900p
VCR7000	1000p
VCR1000, 2000, 6000, 61000, 62000, 8600, 8602, 8700, 9005, DD8900, DD8904, TVR4	1100p
TVR2, TVR3, VCR4600, VCR4600 MKII, VCR400	1100p
VCR8800, VCR8804, VCR9340	2100p
VCR8603, VCR8604, VCR8704, VCR8714	1350p
VCR9140, VCR9142	2550p
VCR9340	3650p
VCR9244	3450p
UF020, 22, VCR3000, 3002, 9500	1750p
FISHER	
FVHP420, 510, 520, 530, 615, 618, 620, 622, 710, 711, 715, 716, 720,	
FVHP721, 722, 730, 830, 905, 906, 907, 908, 910, 911, 915, 916, 918,	
FVHP5000, 5001, 5005, 5050, 5075	1100p
VBS3500, 7100, 7500, 7600, 9900, VBR330	1800p
VBS7000, VBS7100, VBS9000	2000p
FVHP500, 711, 715, 721, 722, 730, 830, 5100, FVHD720	1100p
FVHP725, FVHP830, FVHP980	2500p
FVHP990	2700p
FVHP975	2400p
FVHD407, FVHD140, FVHP1, FVHP10, FVHP20	1150p
FVHD230, FVHP1100, 1200, 130, 1340, 1410, 2000, 200, 210, 300,	
FVHP310, 410, 420	1800p
FVHD250, 270, 370, FVHP1500, FVHP250	2700p
FVHP132, 1400, 1440, 320, 440, 445	3550p
FVHP470S, FVHP475HV	4800p
FVHP1250, FVHP430S	1950p
GOLDSTAR	
8000 3HSSDB, GHV121, RQ2011, 2031, 2051	1900p
GVH51, GVH122, VCP4000, VCP4100, VCP4200	1100p
GHV1232, 1233, 1241, 1242, 1243, 1244, 1245, 1246, 1266, 1290, 1291	
GHV1295, 1296, 1891, 8210, 8215, 1221, 1240, 1241, 1247, 1248, 2145	
VCP400, VCP4130, 4300, 4301, 4305, 4306, 4310, 4311, 4315, 4316,	
VCP4320, 4321, 4325, 4326	1100p
C211, GHV1392P, 1393P, 19OOP, 1290, 1291PQ, 12931Q, 1295P,	
GSE1295PQ, GSE1296, 1297, 1891, 1910, 20005, 2000, GSEC200,	
GSEC205, 211, 2301, QSEG2301,	
GSEQ12, 204, 20, 22, P416P, P500P	
QUISY22, QUISY24, RC205P, RG11P, RG20, RG2001, RQ20,	
RQ204HP, RQ241, VCP100P, GSEG10	1600p
GHV4400, 4400, GSE-Q404P, QUISY40, RC405P	2350p
GSEQ121, RQ2011, RQ2031, RQ2051	1950p
G.E.C.	
4000H, 4001H, 4002H	1200p
V4001H, V4004, V4100	1200p
V4005H	1500p
GRANADA	
CSI, DS2	1600p
VHSAH1	1100p
VHSAH3	2400p
VHSAN3	800p
VHSAY3	1200p
VHSBH1, VHSCH1	2100p
VHSBP1	850p
VHSBY3	2600p
VHSD52	1600p
VHSEH2, VHSDH2	1600p
VHSEY1, VHSEY2	1400p
VHSFS1, VHSFS2	1300p
VHSFG2, VHSFG4, VHSF63, VHSFB3	1300p
VHSTJ1, VHSTJ2, VHSTJ3, VHSWJ3, VHSYJ2	700p
VHSVH4, VHSWH1, VHSXH1, VHSYH2	1600p
VHSWJI VHSXJ3	700p
GRUNDIG	
VS410, 415, 435, 450, 456, 460, 500, 505, 510, 520, 521, 530, 546	1600p
BARCELONA, MVS5400, 440, 500, 600, SE5100, 6100, 6110, 9100	
TVR4500, 4510, 5510, VS400, 440, 441, 500, 505, 510, 518, 600, 610,	
VS5180, VS6190, 700, 900, 901, 902, 9081, GV200, 201, 2092,	
SE2100, 5110	1400p
MADRID, SE5140, VS540, VS5480	3000p
MVS550, 620, VS550, 620, 630, 640, 790, 930, 940	2400p
VS120	2300p
VS680, GV280	4600p
VS160, VS740	4400p
VS170	4600p
MVS660, SE6160, VERONA, VS660, VS6690	3500p
GRUNDIG	
MVS710, 720, 910, SE7120, 9120, VS710, 716, 720, 800, 810, 910, 920,	
VS922, 9291, GV210, 211, 220, 2292, MV2105, 2115, SE2120	1700p
HINARI	
VXL2, 3, 4, 20, 25, 35	1000p
VXL5, V20H	1050p
VXL6	1200p
VXL7	1300p
VXL8, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p
HITACHI	
VT11, 14, 15, 16, 30, 33, 34, 330, 340, 503, 640, 5030, VTP10, 30	1000p
VT7, VT17, VT18, VT19	2000p
VT35, VT350, VT38, VT39	2300p
VT100, 110, 111, 112, 113, 115, 118, 120, 125, 128, 220, 225, 400, 405,	
VT410, 413, 414, 415, 416, 418, 510, 515, 517, 518, 520, 525, 526,	
VTM625, 626, 725, 210, 211, 215, 726, 727, 728, 820, 821, 825, 920, 921	1400p
VT3000	650p
VT4000, VT4200, VT5000, VT5500, VT5600	1100p
VT77, 680, 6500, 6700, 6800, 7000, 8000, 8030, 8040, 8100, 8300, 8500	
VT8700, 9000, 9300, 9500, 9700, 9900	1000p
VT8, 9, 56, 57, 570, 575, 576, 580, 585, 588	3200p
VT65	2400p
VT130, 135, 138, 145, 250, 255, 258, 420, 425, 426, 428, 430, 431, 435	
VT1438, 535, 536, VTL30, 301, VTM630, 635, 636	1900p
VT52, VT60, VT61E, VT62E, VT63, VT64, VT640	1100p
VT168, VT150, VT260, VT450, VT498 (4 HEAD)	2200p
VT530	2050p
VT522, VTM212, 620, 622, 720, 722, 822, 922, 925	1650p
VT660E	2600p
VT570, VT575, VT580, VT585, VT588, VTF70	3100p
VT540, 545, 546, 548, VTD660, 665,	
VTM598, 640, 645, 646,	
VTM730, 731, 735, 736, 740, 745, 746, 748, 753, 754, 830, 831, 835, 838, 840,	
VTM841, 845, 930, 931, 935	2600p
VTF770, 774, 775, 860, 861, 865	4100p
VT85, VT86, VT88	2600p
VTF780, VTF785	4800p
VTF180, VTF185, VTF280	8500p
VTF350, VTF351	5150p
VTM220, VTM220E, VTM220UK	5150p
VTS390E	5150p
J.V.C. & FERGUSON	
HR2200, 3300, 3320, 3330, 3350, 3360, 3660, 3750, 3860, 4100	
3220, 8900, 8901, 8902, 8903, 8906, 8922, 8928, 3V01, 3V06, 3V22	600p
HR3660, 7600, 7610, 7650, 7700, HRD110, 111, 120, 121, 220, 225,	
HRS100, 8904, 8923, 8924, 8925, 8929, 8935, 8941, 8943, 8944,	
3V16, 3V233V24, 3V31, 3V35, 3V36, 3V38, 3V39, 3V49	625p
BR1600, HRD140, 141, 142, 143, 150, 152, 156, 157, 158, 160, 5101	
HRS10, 8947, 8948, 3V42, 3V44, 3V45, 3V46, 3V47, 3V52, 3V54,	
3V55, 3V56, 3V57	1150p
HRD154, 170, 171, 210, 211, 217, 310, 320, 321, 350, 521, 522, 525, 526.	
HRD527, 540, 550, 560, 590, 770, HRDX20, HRDX22, 8950, 8951,	
3V64, 3V65, FV10, FVII, FV20, FV21, FV26	1300p
HRD565, HRD566, 3V48	2200p
HRD725, HRD755, 3V43, 3V53	2850p
8930, 8931, 8933, 8940, 3V29, 3V30	700p
8945	2400p
3V00, 8902, 8903, 8909, 8912, 8922	1000p
FV31, FV41R	1500p
FV37, FV43H, HRD860	3100p
BR7000E, BR7000S, BR7030, BR7030/40H, BR7040	2600p
HR7200, 7300, 7350, 2650, BR6200	700p
HRD455	2000p
HRD520	1400p
HRD300, 400, 580, 600, 620, 640, 650	2000p
HR4100	1000p
HRD750, HRD830, HRD860	3300p
HRD250, HRD257	2300p
3V32, 8942, HR7655	2200p
HRD180, 190, 230, 610, 3V59, FV12L, FV20B, 26, 30, 32, 33, VC141L	2050p
HRD370, HRD430, HRD470, 3V58, FV13H	2300p
HRD530, HRD700, HRD840, HRD870, HRD910, FV14T, FV57H	3100p
GRC1, GRC2, 3 V41	2800p
BR9060, HRD330, 337, 440, 441, 637, 641, 660, 670, 720, 730, 740, 820	
HRFC100, SR3300MS, FV44L	2100p
HRD950, HRD960, HRD980, FV46	5000p
HRS5000, HRS5500, 5800, 9000, FV395.BRS600, SRS368E	5550p
FV22L	1400p
FV42	2600p
VR182LV, VR202LV	1950p
FV67HV, FV68TX, FV77	3800p
R2000 SERIES	4500p
FV61LV, FV62LV, FV67HV	4000p
FV42L	£101.00p
VP160L, VR172L	1950p
HRJ200, HRJ205	3300p
HRJ600EG, HRJ600EK, HRJ605EG, HRJ605UK, HRJ610EK	7100p
HRJ300, HRJ305, HRJ315, HRJ316EG,HRJ318E	3750p
HRJ615, HRJ715, HRJ815	9200p
HRJ400, HRJ405, HRJ407MS, HRJ41 OEK, HRJ415, HRJ416	5850p
MATSUI	
VX500E, 800A, 810A, 820, 80A, 770B, 773B	1200p
VCRL3, VX730, VX750	1450p
VX735, VX755, VX990	1500p
VX735A, VX765, VX850	1750p
VX600	1100p
VX900	2650p
MITSUBISHI	
HS303, HS304, HS320, HS700	1400p
HS306, HS318, HS710	1400p
HS307	2300p
HS319	1900p
HS330	2300p
HS400	2800p
HS349, HSE27, 31, 32, HSB27, 31, 32, HSM33, 34, 35, 37G	2150p
HS411	1900p
HSE30, HSB30	2000p
HS338	1900p
HSE10, HSE11, HSE20, HSE21, HSE41, HSB10, HSB20	2100p
HS300, HS301, HS302, HS310, HS273, HS550Q	1350p
HS200	650p
HS337, HS347	1400p
HSB12, HSE12, HSE22, HSM16G, 18, 23, 25, 30, MX1	2100p
HS411EZ, HS411GZ	2600p
HSB11, HSB21	2000p
HSB52, HSE50, 52G, HSM36, 50, 54, 55, 57, 58, 60	3300p
HSE51	3000p
HS410	3250p
HS412, HS421GZ	4000p
HS5300, HS5424, HS5600	3050p
HSM20, HSM55	2250p
HSM40	2850p
HSM59, HSM68E	6050p
NV300, 322, 332, 333, 340, 390, 2000, 2010, 3000, 7000, 7200.7500, NV7800, 7850, 8170, 8200, 8400, 8600, 8610, 8620	625p
NV777, NV330	1150p
NV8050, NV8051	2800p
NATIONAL PANASONIC	
AG1000, 1050, NV250, 260, 280, 450, 460, 465, 470, 480, 650	1600p
AG6010, AG6015	2500p
AG6840	2400p
NV100, NV200, NV370, NV380, NV630	725p
NVD80, NVH65	3400p
AG5150, AG5250, NVF65, NVH75, NVH77	3200p
NVF51	4200p
NVGI9	2300p
NVJ30, NVHJ33, NVL10, 20, NVL21, NVG30, 31, 40, 130, NVJ37, 40, 42,	
NVSD30, 10EE, 11, 2, 30, 35	1450p
NVJ35, NVG46	1700p
NVM1, NVM3, NVM5	4200p
AG2100, AG2200	700p
NV430, NV431, NV433, NVSD2, NVSD22, NVSD25, NVSD3	1000p
NV730, NV730F, NV770 4 HEAD	1450p
NV366	1850p
NV21 HQ, NV 180, NVD48	2000p
NV7881	2500p
NV810, NV8301	2400p
NV850, NV950	2750p
NV870, NV890, NV970	3200p
AG6024, NVG33, 46, NVL23, 25, 28, NVJ47, 49, 700PX, NVSD20EE, 400, 44, 45	1450p
NVG10, 11, 12, 14, 16, 120, NV250, 280, 450, 465	1500p
NVG18	1800p
NVG20, 21, 22, 25, 28, 200, NVD48	1700p
NVG50, NVG300	2000p
NVG45	1450p
NVH70	3600p
NV688	2400p
NV600	1050p
AG6800, AH6810, AG6820	2600p
AG6100, AG6200, AG6300	2600p
NVG7, NVG9, NV230	1050p
NV780	2400p
NVG 15, NVG400	2600p
NVM7, NVMC20	3800p
NVF70	5200p
NVJ45, NVJ47	2000p
NVSD40	2250p
NVF75, NVF77	4750p
NVF55	4000p
NVFS200, NVFS88, NVSF90, NW8000	4600p
NVHD90, NVHD 100, NV HD 101, NVHF 100	3100p
NVSD1	1400p
AG7330, AG7350, AG7355, AG7450	5000p
NVFS 100	5000p
NVFS1	4850p
N.E.C.	
N9011, 9012, 9013E, 9014E, 9014G, 9015, 9016, 901A, 902A, 9033, N9034, 9040, 9053, 9054, 9055, 9056, 9063, 9065, 9066, 906, 9077,	
N9096, DX1000, 1600, PX1200	1150p
N911A, 914C, 915A, 916A, 917, 9110, 9120	2400p
PVC600, 740, 744, 754, 763E, 764, PV2300, 2400, 760, 794, 770, 774	1650p
N380, N381, N830, N831, N832, N833, N834, N835, N836	700p
82611AH1 (FOR MODEL DX3000), DX4000, N9610, NS7000	3000p
N895	3150p
N9052, N9530, DX2000	3400p
VCP1	1700p
PVC2300, 2400, 740, 744, 760, 764	1400p
DS6000	3500p
D5600	3500p
VH3, VH555, VH600, VH700, VH844, VH900,	1100p
VH1000 (ALL MODELS)	700p
VH1, VH2A	1600p
D1000, D1100	
D1000X, D1500X, D4500, VPCD100, D1200, D2000X, D5000	1600p
VR6460, VR6520, 64VR60, VR6420	725p
VR6711 4 HEAD	1800p
VR6440	2500p
VR6441, VR6540, VR6541, VR6640, VR6642	1300p
DV761, VR512, 522, 5229, 63SB7, VR6760, VR6761, VR6762, VR63SB7 7172	7200p
VR6920	2750p
41DV2, 4SB11BVR412, 415, 6485, 6490, 6880	1600p
VR6948	4850p
20DV1, 20DV2, 20RW7, 21DVI, 21DV2, 21DV3, 2SB01, 02, 11, 12, 30DV2, 31DVI, 31DV2, 31DV3, 3SB02, 03, 05, 11, 12, 13, 68SB4, 71SB4, 86SBI, 91SB2, 92SB2, DV186, 190, 291, 292, 468, 471, VR201, 202, 203, 2115, 212, 213, 223, 231, 232, 302, 303, 305, 311, 312, VR313, 3210, 3219, 322, 3229, 323, 501, 6180, 6182, 6185, 6290, 6291, VR6293, 6362, 6367, 6467, 6468, 6470	4600p
VR3260, 6349, 6442, 663, 6448, 6449, 6542, 6643	1250p
VR601	1800p
49SB6, VR6548, VR6648, VR6843	2750p
SAISHO	
VR100, 605, 705, 805, 905, 1000, 1100, 1200, 1600	1200p
VR3300X, VR3600X, VR3650X, VR3800	1400p
VR3200, VR3500	1400p
VR2000, VR3300, VR3600	1400p
VR2500	2650p
VRS5000X, VX6000A, VXL12X	1500p
SALORA	
6500, 6600	1600p
SV7300, SV8200, SV8300, SV9200	1500p
SV7400, SV8400	1600p
SV8100	1200p
SV900, SV9900	3450p
SV601, SV611, SV6910	1500p
SV800, SV810	2800p
SV6700, SV8710, SV8750	1500p
623N, SV6800, SV6900, SV8850, SV8870, SV8970	1750p
SV88110, SV8910	2650p
823N, SV8920	3500p
923N	4500p
SV8600, SV8700	1550p
SV8420	2400p
SV8620	2100p
SV9300	2500p
SV8830	2200p
SV8720	2250p
SV8520	1900p
SAMSUNG	
SV8500	1500p
SVX301, VB900, 910, VVT510, VT320, 5600, VX510, 511, 520.616, VX626, 627, 717, 614, 619, 629, 710, 712, 720, 730, 970, 971, 972, SV716, 717, SVX303, 305, VB510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 710, 971, V1520, 616, 621, 626, 900, 910,	1200p
SVX319, VB770, V1710, 730, 731, 735, 750, 751, 770, VB750, VK8220, VX750, VX7330, VK770, VK8225, VR1730, 1735, XR20	1900p
V11560, VN1560, VN1561, VX1530, VX1560, VX1561, VX1580	2200p
PL30LR, PX3031, 31R, 32R, 990, 992, 991, PXP30, PXR30, VX 1260, SVX503,	
SX3230, 3231, 3260, 3261, VK30, 300, 1230, 1260, 1261,	
VK30R, 31R, 32R, VXK300, 301, 306, 320, 321, 326, 336	1900p
S11230, 1240, SVX600, SX1230, 1231, 1260, 1261, 7120, 7121, 7220, SX7221, 7230, 7301	4600p
SANYO	
VTC5000, 5400, 600, 6000, 6010, 6500, VPR5000, VTC 1500, VTCM 10, 11, 20, 21 VTCM25, VTC2000, 5100, 5150, 5300, 5400,	
VTC5350, 5370, VTCNX10, VTCNX15, 20, 30, VPR5800	1800p
VTC5500, 5550, 9100, 9300, 9350, 9355, 9455, 9500	1900p
VHR1110, VHR1150, VHR1300, VHR1700, VHR2300, VHR2370	1200p
VHR3200, 3270, 3100, 3110, 3150, 3300, 3400, 3310, VHRD500	1500p
VHR1500, VHR2500, VHR3330	2100p
VHR2700	2450p
VHR7900	3000p
VHR5700, VHR7700E, VHRD4710	2700p
VHR150E, 153, 154, 1501R, 240, 250, 251, 27, 350, 474, 5350E, 7500, VHR7530, 7540, 8500SP, 8800, VHRD5350E, 5450E, 6550	3850p
TLS1000P, TLS1001P, TLS1100	3100p
VHR120, 130, 14, 141, 143G, 14SP, 151, 15, 16, 171, 220, 23, 244, 274, VHR310, 330, 4100, 4105, 4200, 430, 4300, 4400, 4500, 5080, 5100,	
VHR5200, 5600, 6850, 7100, 7200, 7250, 7300, 8070, 8100, 8101, 8200, VHR7800, 7810, 8000SP, 8801SP, VHRD4400, 4410, 4500, 4600,	
VHRD4610, 6700, 4800	3100p
TLS2000	4250p
VHR5300, VHR6500, VHR7400	4500p
VHR3500EX	2150p
VHR16, 235, 335E, 4150, 4160, 4350, 7250, 7260, 8250	1950p
VTC3000	1400p
SHARP	
VC390, VC393, VC496	2750p
VC488	4200p
VC779	1800p
VC789, VC790	2900p
VC200, 220, 300, 381, 383, 384, 385, 386, 387, 388, 471, 477, 481, 482, VC483, 486, 3300, 8381, 9100, 9300, 9400, 9500, 9600, 9700	1100p
VC108, 208, 382, 402, 405, 408, 500, 550, 571, 573, 581, 582, 583, VC5W20E, 600, 651, 674, 681, 684, 6V3, 750, 780, 781, 683, 684, 402,	
VC500, 571, 573, 580, 584, 600, 682, 693, 700, 772, 7810, 782, 7822, VC783, 8481, 8581, VCA10, 100, 102, 103, 1031, 103, 104, 105, 106,	
VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT212, 310, 410, VCT510, 72, VCT1314, VCTS313	1100p
VC6000, 6200, 6300, 7300, 7700, 7750, 8000, 8300	1800p
VC793	3000p
VC473, VC785, VC786	2200p
VC699, VCA501, VCA602	2800p
VC585, VC685	2000p
VC90ET	3900p
VFH815	2800p
VC800, VCH851, VCH852, VCH882	2700p
VCH80, VCH81, VFH815	2800p
VCA33, VCA36, VCA43, VCA44, VCA46, VCA49	1500p
VCA55, VCA63	2200p
VC570	2800p
SONY	
DSR-19R FOR SL-T 9ME	3100p
DSR-21 R FOR SLC 8-C9	2600p
DSR-35R FORC20, C30, C40, SLF1UB, SLF1E2 PIN, SLC24PS, 33E, 34, 44PS, SLF11, 30PF, 35, 60PS, SLK85, SLT20ME, 30ME, SL100	1500p
DSR-43R FOR SLC7 RANGE, SL5000, SL5100, SL3000 1 PIN, SLC6E, SL36ES, SL37E	1300p
SL3000, SL8000, SL8080, SLC5E, SLT7ME	1600p
SLV201, SLV202	2000p
SLK95, SLT50ME	2900p
SLV275, SLV373VB, SLV410, SLV412, SLV427, SLV474 DSR49R, SLHF100P, SLHF100UB	2200p
SLV656, SLV715, 725, 727, 757, SLV777, SLV815, SLV825	3850p
SLV353UB	4600p
CCDF340E, CCDF500E, CCDV90E, CCDV95E, CCDSP5E	2600p
SLV801, SLV802	4800p
SLV310, SLV315, SLV325, SLV335	3550p
SLV210, SLV212, SLV270, SLV273, SLV285, SLV300	1600p
SLV125, 213, 225, 252, 255, 262, 280, SLVX1, 20, 3	1150p
SLV363, SLV416, SLVX50, SLVX55	1750p
SLVX75, SLVX90, SLVX95	2750p
SLV282, SLVX30, SLVX35	3000p
SLHF100P, SLHF100UB	3025p
SLVE7, SLVE8, SLVE9	3850p
SLVE90	5150p
SLV615, SLV625, SLVE600, SLVE700, SLVE800	5150p
TOSHIBA	3450p
V63	1500p
V9680	3400p
V8600, V8650, V8700	3000p
V21, V31, V32, V33, V50, V51, V52, V53, V9600	1450p
V55, V57	700p
V71, V73, V74, V75, V77, V80, V81, V82, V83, V841V85, V86, V87, V88	1200p
DV90, 96, 97, NM3, V108, 109, 199, 200, 202, 205, 207, 209, 80, 93, 94	1450p
V5470, V5480	1300p
V600	2350p
V880MS	2600p
V700G	3700p
V500G, V509G	2500p
V9680	2900p
V300G, V301, V305, V306, V309G	2550p
V61, V63	1700p
V110, V120, V130, V140, V210, V211, V212,	1500p
V220, V221, V222	3850p
V711, V880	1200p
VCPB1E, VCP2C2	1250p
V65, V66, V6	2600p
V312, V322, V412	4600p
V91G	3200p
V609, V610V610B, V610UK, V611, V659F, V660, V660F	9200p
V312, V403T, V413G	5200p
V703W, V813G	8000p
V95G	

GRANDATA LTD
TEL: 0181-900 2329
FAX: 0181-903 6126

ALL TV & VIDEO PARTS SOLD ARE REPLACEMENT PARTS

VCR BELT KITS

Model	Price
AKAI	
VP7100, VS9300, VS9500, VS9700, VS9800	**120p**
VS1, VS2, VS3, VS5, VS12, VS15, VP88	**100p**
VS10	**65p**
VSX9, VS105, 112, 115, 116, 120, 125, 126, 155, 165, 205, 220, VS24, 240, 244, 245, 247, 248, 250, 512, 515, 516	**300p**
VS22, VS23, VS25, VS35, VS37, VS38, VS53, VS55, VS66	**80p**
VS4, VS6, VS8, VS9	**120p**
VSA77	**140p**
VSS99	**105p**
ALBA	
VCR40000	**130p**
VCR5000, VCR6000	**105p**
VCR161, VCR222	**100p**
VCR3000X, VCR4000, VCR4000X	**75p**
VCR7000, VCR7800, VCR8000,VCR8800	**110p**
VTV10	**105p**
AMSTRAD	
TVR123, VCR4600, VCR4700, VCR5200	**110p**
VCR7000	**80p**
VCR1000, 2000, 6000, 6100, 6200, 8600, 8602, 8603, 8604,	
VCR8700, 8704, 8714, 8800, 8804, 9000, 9005, 9244, 9340,	
DD8900, DD8904, TVR4	**110p**
TX3650, UF20, 22 24, VCR3000, 3002, 4000, 9500	**75p**
VS1004	**105p**
BLAUPUNKT	
RTV100	**200p**
RTV200, RTV222, RTV224	**90p**
RTV202, RTX200	**150p**
RTV322, RTV248	**100p**
RTV306, 307, 309, 310, 311, 312, 328, 414, 434, 444, 707	**135p**
RTV211, RTV214	**140p**
RTV324, RTV32565p	
RTV315, RTV316, RTV319, RTV320, RTV317	**50p**
RTV301, RTV333, RTV338, RTV404, RTV424	**85p**
FERGUSON	
3292, 3V00, 3V01, 3V16, 3v22, 8900, 8901. 8902, 8903, 8904,	
8906, 8909, 8912, 8922	**120p**
3V23, 8923, 8924, 8929	**65p**
3V29, 3V30, 8930, 8931, 8933, 8940	**75p**
3V31, 3V32, 8941, 8942	**75p**
3V35, 3V36, 3V38, 3V39, 3V49, 8943, 8944	**75p**
3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V57,	
8945, 8947, 8948	**55p**
3V58, 3V43, 3V44, 3V59, 3V64, 3V65, 8950,	
8951, FV10, FV11, FV12, FV13, FV14, FV20,	
FV21, FV22, FV26, FV32, FV39, VC141L	**55p**
FV31R	**110p**
FV61L, FV62, FV67, FV68, FV70, FV71, FV72, FV74, FV77	**50p**
FV43H, FV44L, FV46T, FV57H	**100p**
FV37H	**80p**
3V52	**55p**
FV41R, FV42L	**100p**
FIDELITY	
HQS200, VCR1000, 2000, 600, 6000, 6100	**180p**
VCR100	**160p**
VTR1000, VTR1001	**100p**

Model	Price
TX3650, VCR3000, VCR3002, VCR9500	**75p**
FISHER	
VBS7000	**245p**
VBS9000	**120p**
FVHP520, FVHP530, FVHP420	**60p**
FVHP615, 618, 620, 622, 710, 711, 715, 720, 721, 722, 725, 730,	
FVHP830, 840	**75p**
FVHP905, 906, 907, 908, 910, 911, 915, 916, 918	**75p**
VBR330, VBS7500, VBS7600, VBS9900	**100p**
VBS3500	**75p**
FVHD140, FVHD40, FVHD55, FVHP1, FVHP10, FVHP20	**110p**
FVHD230, 250, 270, 370, FVHP1100, 1200, 1250, 130, 132,	
FVHP1340, 1400, 1410, 1440, 1500, 2000, 200, 210, 250, 3, 300,	
310, 320, 2000, 410, 420, 430, 440, 445, 470, 475, FVSD2905	**85p**
FVHP5000, 5005, 5050, 5075, 5100, 975, 980, 990	**95p**
G.E.C.	
4005	**150p**
V4004	**100p**
V4007	**80p**
GOLDSTAR	
GHV1221, 1232, 1233, 1240, 1241, 1242, 1243, 1244, 1245,	
GHV1246, 1247, 1248, 1250, 1266, 51, 8000, 8200, 8210, 8215,	
VCP4100, VCP4130	**80p**
GHV1290, 1291, 1295, 1296, VCP4000, 4200, 4300, 4301,	
VCP4305, 4306, 4310, 4311, 4315, 4320, 4321, 4325, 4326	**120p**
GRANADA	
VHSH1, VHSAH3	**100p**
VHSVH4, VHSWH1, VHSXH1	**60p**
VHSYH2	**50p**
VHSBH1, VHSCH 1	**150p**
VHSBP1	**135p**
VHSAN3	**110p**
VHSDS2	**125p**
VHSAY3	**125p**
VHSBY3	**100p**
VHSEY1, VHSEY2	**70p**
VHSCC1	**100p**
GRANADA	
VHSDP1, VHSFV2	**80p**
VHSTJ1, VHSTJ2	**150p**
VHSTJ3	**65p**
VHSWJ1, VHSWJ2	**120p**
VHSXJ3	**85p**
VHSYJ2	**80p**
VHSFJ2	**140p**
VHSFS1, VHSFS2	**130p**
VHSFG1, VHSFG2, VHSFG3, VHSFG4, VHSF63	**180p**
GRUNDIG	
MVS400, 440, VS400, 410, 415, 435, 440, 441, 450, 456, 460	**55p**
VS180, 200, 220, 226, 262, 265, 267, 2X40800, 0850, 0880,	
1600, 2000, 2080, 2200, 2280,	
MVS200RC	**90p**
VS150	**160p**
VS310, 311, 315, 320, 326, 340, 345, 380, 385, 445	**85p**
VS150	**75p**
LC290N, LC295SN, SVS 180, VS 170	**70p**
VS 160, BARCELONA, FLORENZ, GV4000, 4000, 4001,	
GV4002, 400, 401, 4010, 402, 403, 404, 405,	

Model	Price
406, 407, 4092, 410, GV411, 412, 414, 415, 416, 417, 4192, 4200, 420, 430, 434, 435,	
GV437, 440, 450, 4592, 460, 464, 470, 500, 501, 5050, 5095.	
GV5105, 511, 530, 5395, 540, 560, 5695,	
MV4005, 4105, SE4100, 4104, 4120, 5102, 5104, 5106, TVR37001	**70p**
HINARI	
VXL2	**80p**
VXL7, VXL8, VXL9, VXL10, VXL11, VXL19, VXL90, VCR34, VTV 100,	
200	**180p**
VXL4, VXL35, VTV300	**70p**
VXL5, VXL6	**160p**
VXL3, VXL20	**90p**
HITACHI	
VT11, 14, 16, 17, 19, 33, 330, 34, 35, 350, 38, 39, 88, 165, 5030	**85p**
VT5000, VT5500, VT18	**120p**
VT7000, VT8000, VT8030, VT8040, VT8300, VT8500, 8700	**60p**
VT680, VT6500, VT6800, VT9300, VT9500, VT9700, 9900	**75p**
VT52, VT57, VT61, VT62, VT63, 64, 65, 85, 86, 640	**90p**
VT3000	**120p**
VT100, 110, 111, 113, 115, 118, 120, 125, 128, 130, 135, 138,	
VT145, 150, 168, i70, 175, 220, 225, 250, 255, 258, 260, VTL30	**90p**
VM500 VM600	**90p**
J.V.C.	
HR3300, HR3330, HR3360, HR3660, HR4100	**130p**
HR7200, HR7300	**70p**
HR7350, HR7600, HR7610, HR7650, HR7655	**75p**
HR7700	**75p**
HRD110, 111, 120, 121, 220, 225, BP5000	**90p**
HRD140, 141, 143, 150, 152, 157, 158, 160, 190, 250, 257, 310, HRD455, 565, 566, 725, 755, HRP50	**55p**
HRD170, 171, 180, 210, 21 1, 217, 230, 300, 320, 321, 330, 337, HRD350, 370, 400, 430, 440, 44 1, 500, 530, 700, 750.950,	
HRS5000, 5500, 8000, 9000, BR9060, BRS600, 605, 920, 925	**50p**
HRD227, 520, 52 1, 522, 527, 600, 610, 620, 637, 641, 650, 830,	
HRD840, HRDX20, 22, HRJ200, 205, 300, 305, SR330, HRS10	**80p**
HRD840, 550, 560, 580, 590, 640, 660, 670, 720, 730, 740, 770, HRD820, 860, 870, 880, 910, 960, 980, HRDX20, 25, HRJ2 10,	
HRJ215, 315, 316, 318, 400, 405, 407, 410, 411, 415, 416, 507, HRJ6 10, 615, 715, 97,	
HRS4700, 5800, SR3200, SRS368E	**60p**
HRJ600	**40p**
LOGIK	
VR955	**180p**
MATSUI	
VX600, 730, 735, 750, 755, 765, 850, 6000, VS888	**75p**
VX1000, VX2000, VX2500, VX3000, VX6000	**100p**
VX800	**70p**
MITSUBISHI	
HS200	**200p**
HS300, 301, 302, 307, 310, 337, 338, 347, 349, 411, 412, 421, 480, HSB10, 20, 30, HSE10, 20, 30, 70	**110p**
HS303, HS304, HS306, HS307, HS330, HS400, HS700	**110p**
HS318, HS319, HS410	**110p**
HSM1000, 16, HSM23, 25, 33, 34, 35, 37, 54, 55, 57, 58, 59, 68	**55p**

Model	Price
N.E.C.	
N830, N831, N832, N833	**100p**
N895	**80p**
PVC2300, PVC2400	**180p**
DX1000, 1600, 1800, 2000, 3000, N9012, 9013, 9014, 9016, N9033, 9034, 9053, 9054, 9055, 9056, 9066, 9096, 9110, 9120,	
N9510, 9520, 9530, 9610	**85p**
NATIONAL PANASONIC	
NV300, NV330PX, NV332, NV333 NV340, NV366	**100p**
NV777, NV788	**100p**
NV2000, NV2010, NV3000	**100p**
NV7000, NV7200, NV7800	**95p**
NV8600, NV8610, NV862	**145p**
NV230, 250, 280, 430, 431, 433, 450, 460, 465, 470, 650, 730, NV770, 810, 870, 890, 970, AG 1000, 1050	**110p**
NV370, NV380, NV480, NV630, NV780, NV830, NV850	**70p**
NV600, NV688, AG6010, AG6015	**100p**
NVG7, 9, 10, 11, 12, 14, 15, 16, 18, 30, 130, 400, NVH70	**50p**
NVFV1, NVM10, 3000, 3300, 40, 7, 9000, 9900, NVMS1, 4	**70p**
NVM 1, NVM3, NVM5	**70p**
PHILIPS	
VR6460, VR6920	**170p**
VR6540	**100p**
VR6442, VR6542	**70p**
VR2025, VR2580	**100p**
DV186, 190, 286, 291, 292, 468, 471, 562, 571, 761, VR201, 202, 203, 211, 2115, 212, 213, 223, 311, 312, 313, 3210, 3219, 322, 32, 29, 323, 535, VR20DV1, 20DV2, 20RW7, 21DV1, 21DV2, 21D, V3, 25BO1, 25BO2, 11, 12, 302, 303, 305, 31DVI, 31DV2, 31D, V3, 3SB11, 3SB12, 3SB13, 72SB8, VR30DV2, 35BO2, 35BO3, 635B7, 715B4, 715B5, 715B8, VR865B2, 915B2, 925B3, VR6180, 6182, 6185, 6285, 6290VR6291, VR6293, 6362, 6367, VR6390, 6391, 6393, 6467, 6468, 6470, 6561, 6570, 6581, 6670, VR6676, 6710, 6760, 6761, 6762, 6870, 6970, 6975, VR68SB4, 86SBi, 92SB3	**85p**
VR445B9, VR445B920, VR445B922, VR6443, 6843, 6843, VR6943	**100p**
VR3260, 6349, 6448, 6449, 6548, 6648, 49SB620, 644869S, 49SB6	**110p**
VKR6850, VKR6855	**70p**
VR501	**110p**
VKR6800, VKR6810, VKR6820	**70p**
SE4104, VR231, 2310, 2319, 231, 232, 2329, 237, 23, 241, 2410, 2419, 242, 243, 245, 2469, 247, 2479, 251, 252, 256, 257, 258, 33, 19, 332, 3329, 333, 337, 339, 3419, 342, 343, 3469, 347, 3479, 35, 1, 352, 357, 358, 422, 4229, 432, 437, 442, 4229, 432, 437, 442, 44, 5, 4469, 447, 4479, 451, 452, 457, 458, 459, 512, 522, 5229, 6379, 642, 647, 722, 7229, 723, 7379, 747, 8389, 948, 9489	**70p**
SAISHO	
VR2000, VHL3	**90p**
VR3800, 3200, 3300, 3500, 3600, 3650, VRS4400, 5000	**75p**
VR3400	**100p**
SAMSUNG	
SV716, 717, V1616, V–621, V1626, VX616, VX617, VX619, X626, VX627, VX629, VX714	**85p**
VB520, 510, 610, 616, 617, 619, 620, 626, 627, 629, V1510, 520, V1611, 616, 621, 626, VX510, 511, 520, VT320, 5600	**100p**
VB900, VB910, V1900, V1910	**110p**
PX980, 981, 982, SE9001, SV9001, SVX307, 319, 322, VB750, 770, 8220, 8225, V1770, 790, 8220, 8225, VK8220, VPX31, VX750, VX770, 790, 8220, 8225, SE9000, 9001	**90p**
SVX301, 303, 305, SX7301, VB710, 971, V1710, 730, 750, 970, VX710, 712, 720, 730,	

Model	Price
970, 971, 972	**100p**
VX9880	**110p**
SX7121	**95p**
SANYO	
VTC5000, 5150, 6000, 6500, VTCM10, 11, 20, 21, 30, 31, 50	**75p**
VTC5300, VTC5350, VTC5400, VPR5800	**80p**
VTC5500	**70p**
VTC9100, VTC9300	**140p**
VTC1100, 1300, 1500, VHR1100, 1110, 1150, 1200, 1300,	
VHR1500, 2370, MVR220	**90p**
VHR2100, VHR2300, VHR2500, VHR2700	**100p**
VHR3100, 3110, 3150, 3300, 3310, 3400, 3500, 3700, 3800, VHRD500, 700, TLS1000, TLS1001	**80p**
VHR120, 130, 14, 141, 143, 14, 150, 151, 153, 154, 15, 16, 171, VHR194, 220, 23, 235, 240, 244, 250, 251, 274, 297, 310, 330,VHR335, 390, 4100, 4105, 4150, 4200, 430, 4300, 4350, 474, VHR4770, 5080, 5100, 5200, 5300, 5350, 5700, 6850, 7100, VHR7200 7250, 7260, 7300, 7400, 7500, 7520, 7530, 7530, VHR7540, 7700, 774, 7800, 7810, 8000, 8100, 8200, 8250, 8500,VHR8800, 8801, VHRD4400, 4410, 4500, 4600, VHRD4610, 4710, 4890, 6700	**75p**
VMD66, VMD68P	**80p**
VTR1000	**70p**
VTC6010	**75p**
SHARP	
VC200, 381, 384, 385, 386, 388, 390, 393, 838, 9100, 9300, 9500, VC9700	**100p**
VC7300, VC7700, VC7750, VC7800, VC8000	**110p**
VC8300	**115p**
VC300, 387, 471, 473, 481, 482, 483, 486, 488, 496, 8481	**80p**
VC402, 500, 571, 573, 581, 582, 583, 584, 585, VCSF3, VC8581	**80p**
VC108, 405, 408, 550, 600, 651, 674, 681, 682, 682, 684, 685, 693	
VC700, 750, 783, VC6F3, VC6V3	**70p**
VC208, 671, 772, 779, 780, 781, 782, 785, 786, 787, 793, 800,VC7810, 7822, VCA100, 102, 103, 104, 131, 140, 170, 202, 03, VCA234, 501, 502, 602, 5011, VCB311, 361, VCD801, 802, VCH851, 852, 882, VCM73, VCT72	**75p**
VCA10, 103, 105, 108, 113, 11613, 211, 234, 244, 254, 30, 33, 35, VCA36, 37, 40, 43, 454, 48, 50, 505, 51, 52, 53, 54, 55, 56, 57, 58, VCA60, 605, 615, 67, 68, 1031, VCB320, VCB597, VCD805, VCD806, 810, 815, VCH80, 81, 85, 865, 910, VC51000,	
VCT212, 310, 410, 610, VCT1314, VCTS312, 313, VC790ET	**80p**
VCC10	**70p**
SONY	
SLC6, SLJ10, SLT6ME	**140p**
SLC5, SLC7, SLJ7, SLJ9, SLT7ME	**140p**
SLC9, SL8000, SL8080, SLT50	**165p**
SL8000E, SL8080E, SL8200, SL8600	**175p**
SLV255, 125, 213, 225, 262, SLVX1, 20, 3	**95p**
TOSHIBA	
V55, V57	**85p**
V33, V31, V32, V51, V52, V53, V9600, V9680	**85p**
V61, V63, V65, V66, V67	**150p**
DV80B, DV80D, V71, 73, 74, 75, 77, 81, 83, 85, 86	**80p**
V108, 109, 110, 120, 130, 140, i99, 209, 210, 211, 220, 221, 411,V421, 609, 610, 611, 659, 660, 711, 880	**120p**
V91 G, V95G	**115p**
V212, 213, 22-2, 3i2, 322, 403, 412, 413, 610, 703, 813	**50p**
VCPB1E	**110p**

REPLACEMENT IDLERS & PULLEYS

Make	Models	Description
.....Hitachi	VT11, 14, 17, 19, 33, 34, 35, 38, 39, 52, 57, 61, 62, 63, 64, 65, 85, 86, 330, 350, 640, 16S, 5030	FF Rew Idler 6886792
Order Code: IDL01		**Price 100p**
Hitachi	VT680, 6500, 6800, 9300, 9500VT9700, 9900	Play Idler 6861482 6861481
Order Code: IDL02		**Price: 180p**
Blaupunkt	RTV301, 306, 307, 309, 311, 312, 315, 316, 317, 319, 320, 404, 414, 424, 434, 444, 478, 707	Idler
Goldstar	GHV1221, 1232, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, GHV1248, 8000, 8200, 8210, 8215, GVHP51, VCP4100, 4130	Idler
Grundig	MVS400, 440, VS400, 410, 440VS450, 460	Idler
National	NV230, 250, 260, 280, 370, 380, NV430, 431, 433, 450, 460, 465, 470, 480, 630, 650, 730, 780, NV810, 830, 850, 870, 890, NVG7, 9, 10, 11, 12, 14, 15, 16, 18, 30, 130, 400, AG1000, AG1050, 1200, 1500, 1810, AG2100, 2200, NVH65, 70	Idler Arm VXP 0521
Philips	VR6460, VR6520, VR6920	Idler Arm 40340162
Order Code: IDL08		**Price 100p**
Amstrad	VCR7000	Idler 150280
Sharp	VC200, 381, 383, 384, 385, 386, VC388, 390, 393, 3300, 8381, 9100, 9300, 9500, 9700	Idler NIDL0005GEZZ
Order Code: IDL10		**Price: 100p**
Philips	VR6540	Idler
Sharp	VC300, 387, 402, 471, 473, 477, VC481, 482, 483, 486, 488, 496, 500, 571, 573, 581, 582, 583, 584, 585, 8481, 5F3, 5W20E	Idler NIDL0006GEZZ
Order Code: IDL11		**Price: 100p**
Akai	VS10	Reel Idler
Ferguson	3V23, 3V29, 3V30, 3V31, 3V323V35, 8923, 8924, 8929, 8930, 8931, 8940, 8941, 8942	Reel Idler PU48967
J.V.C.	HR7200, 7300, 7350, 7600, 7610, 7650, 7655, 7700	Reel Idler PU48967
Order Code: IDL20		**Price: 175p**
Ferguson	3V39, 3V30, 3V31, 3V32, 3V353V36, 3V38, 3V39, 3V49, 8930, 8931, 8933, 8940, 8941, 8942, 8943, 8944	Take Up Idler PU 51402
J.V.C.	HR7200, 7600, 7650, 7655, 7300, 7350, 7610, HRD110, 111, 120, 121, 225	Take Up Idler PU 51402A
Order Code: IDL22		**Price 100p**

Make	Models	Description
Ferguson	3V39, 3V30, 3V31, 3V32, 3V353V36, 3V38, 3V39, 3V49, 8930, 8931, 8933, 8940, 8941, 8942, 8943, 8944	Take Up Clutch PU 51380
J.V.C.	HR7200, 7600, 7650, 7655, 7300, 7350, 7610	Take Up Clutch PU 53462A PU 51380
Order Code: IDL23		**Price: 200p**
Philips	DB532, VR6520, 6843, 644	Reel idler
Sharp	VC600, 651, 681, 682, 684, 685, 693, 699, 700, 783, 6FR, 6V3, 6F3	Idler Assembly NPLYV0107GEZZ
Order Code: IDL88		**Price: 615p**
Philips	VR6843, 6943, 44SB9, VR44SB920, 44SB922, 6943	Reel Drive Unit
Sharp	VC772, 780, 781, 782, 785, 786, VC787, 800, 793, 799, 7810, 7822, VCA100, 102, 104, VCA131, 140, 170, 202, 203, 234, 501, VCA602, 5011, VCD801, 802, VCH851, 852, VCH882, VCM73, VCT72, VC782MK11	Idler NPLTV0111GEZZ
Order Code: IDL90		**Price: 700p**
N.E.C.	N911, 915, 916, 917, 9012, 9013N9014, 9016, 9033, 9034, 9053, N9054, 9055, 9056, 9066, 9096, N9110, 9120, 9510, 9520, 9530, N9610, DX1000, 1600, 2000, DX3000, PX1200	Idler Arm Assembly
Order Code: IDL245		**Price: 270p**
Philips	DV186, 190, VR211, 2115, 212, 213, 223, 286, 291, 292, 311, 312, 313, 3210, 3219, 322, 3229, 323, 535BO, VR486, 471, 562, 582, 571, 761, 201, 202, VR203, 302, 303, 305, 6180, 6182, 6185, 6285, 6290, 6291, 6293, VR6362, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561, 6570, 6581VR6670, 6676, 6710, 6760, 6761, 6762, 6870, 6970, 6975, 86B1, 63SB7, 68SB4, 71SB4, 71SB5, 72SB8, 72SB8, 92SB31, 20DV1, 20DV2, 20RW7, 21DV1, 21DV2, 2SB01, 2SB02, 2SB11, 2SB12, 30DV2, 31DV1, 31DV2, 31DV, 33SB02, 3SB03, 3SB05, 3SB11, 3SB12, 3SB13	Pressure Roller Assembly PS403-40205
Toshiba	V91, V95	Pressure Roller Assembly PS403-40205
Order Code: PR232		**Price: 300p**

REPLACEMENT IDLER TYRES

Akai	M32773	IT01	Ferguson	PU51380	IT07		VXP0433	IT15
	MZ366960J2	IT02		PU51402A	IT08		VXP0463	IT16
Goldstar	VXP0521	IT17		PU55373	IT09		VXP0521	IT17
Hitachi	6861471	IT03		PU55374	IT10		VXP0581	IT18
	6861482	IT04	National	VXP0329	IT11	Sanyo	1430662T15620	IT19
	6886971	IT05	Panasonic	VXP0343	IT12	Sharp	NIDL0005GEZZ	IT20
JVC	PU48697B	IT06		VXP0344	IT13		NIDL0006GEZZ	IT21
				VXP0401	IT14		NPLY0107GEZZ	IT22

Price:
20p each
16p each pack of 5
13p each pack of 10

Packs are for each model

SPECIAL OFFERS!
See Page 814

PINCH ROLLERS

Model	Price
AKAI	
VS10, VS9300, VS9500, VS9700, VS9800, VP7100, VP77	165p
VS1, VS2, VS3, VS4, VS5, VS6, VS8, VS9, VS12, VS15	165p
VS105, 112, 115, 116, 120, 125, 126, 155, 165, 205, 220, 240, 244, 245, VS247, 248, 250, 512, VS515, 516, VSX9	165p
VS201, 301, 303, 304, 603, 606, 607, VSP8, VSP82, VP58, VP82	165p
VS125, VS155, VS165, VS220, VS240, VS250, VS512	165p
VS22, 23, 25, 35, 37, 38, 53, 66, 75, 422, 425, 426, 427, 462, 465, 467, VS485, 765, 766, 767, 768, 865, 867, 965, 967, VSA77, VSA650, VSF10, 11, 12, 15, 180, 190, 200, 210, 220, 221, 222, 230, 240, 30, 33	165p
VSF330, 4, 500, 550, VSP88, VSR100, VSX400, 450, 470	165p
VSF260, 261, 262, 265, 270, 274, 275, 280, 290, 340, 350, 410, 420, 43C	
VSF441, 440, 450, 455, 480, 490, 497, 510, 560, 580, 590, 599, 600, VSG20, 21, 23, 24, 25, 30, 33, 34, 35, 51, 54, 55, 60, 64, 65, 70, 73, 74, 75, VSP110, VSX560, VSX580	165p
VS17, 20, 22, 23, 24, 25, 26, 27, 35, 37, 38, 53, 55, VSA77	775p
PINCH ROLLER ASSEMBLY VS422, 425, 426, 427, 462, 465, 467, 485, 498, 765, 766, 767, 768, 865, 867, 965, 967, VSA650, VSF10, 11, 12, 14, 15, 180, 190, 200, 210, 220, 221, 222, 230, 240, 30, 300, 301, 310, 320, 33, 330, 4, 500, 510, 600, VSR110, VSX100, 400, 450, 470	800p
PINCH ROLLER ASSEMBLY VSS99	165p
ALBA	
VCR3000X, VCR4000	165p
VCR5000, VCR6000	165p
VCR161, VCR222	165p
VCR7000, VCR7800, VCR8000, VCR8800	165p
VTV10	165p
AMSTRAD	
VCR1000, 2000, 4500, 4600, 4700, 5200, 6000, 6100, 6200, 8600, VCR8602, 8603, 8604, 8700, 8704, 8714, 8800, 8804, 9000, 9005, VCR9244, 9340, DD8900, 8904, TVR1, 2, 3, 4	165p
VCR7000	165p
DD8900, DD8904, VCR6000, 6100, 6200, 8600, 8602, 8603, 8604, VCR8700, 8800, 900>9, 9140, 9244, 9340	700p
PINCH ROLLER ASSEMBLY PART NO: 153148 TX3650, UF20, VCR3000, VCR3002, VCR4000, VCR9500	300p
PINCH ROLLER ASSEMBLY PART NO: 2554966 DD9900, 9904, TX3650, UF20, 22, 24, VCR3000, 3002, 9500	165p
VS1004 VS1104	165p
FERGUSON	
3V00, 3V01, 3V16, 3V22, 3V23, 3V24, 3292, 8900, 8901, 8902, 8903, 8904, 8906, 8909, 8912, 8922, 8923, 8924, 8925, 8929	165p
3V29, 3V30, 3V31, 3V32, 3V52, 8930, 8931, 8933, 8940, 8941, 8942	165p
3V35, 3V36, 3V38, 3V39, 3V42, 3V43, 3V44, 3V45, 3V48, 3V49, 3V53, 3V54, 3V55, 3V56, 3V57, 3V58, 3V59, 3V65, FV10, FVII, FV12, FV14, 8943, 8944, 8945, 8947, 8948	165p
3V52	165p
8950, 8951, FV10B, 11R, 13H, 14T, 20B, 21R, 22L, 26D, 31R, 32L,FV33H, 39S, 41R, 42L, 50B, 51R, 52L, VC141L	165p
FV37H, FV44L, FV46T, FV43H, FV57H	165p
3V35, 3V36, 3V38, 3V39, 3V49, 8943, 8944	1100p
PINCH ROLLER ASSEMBLY 3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V56, 3V57, 8945, 8947, 8948	1350p
PINCH ROLLER ASSEMBLY FV37, FV57, FV58	350p
PINCH ROLLER ASSEMBLY FV31R	165p
FV41L, FV42L	925p
PINCH ROLLER ASSEMBLY 3V58, 3V59, 3V64, 3V65, FV10, 11, 12, 13, 14, 20, 21, 22, 26, 30, 32, 33 FV39, VC141L	875p
PINCH ROLLER ASSEMBLY FV43H, FV44L, FV45X, FV46T	700p
PINCH ROLLER ASSEMBLY FV61, FV62, FV67, FV68, FV70, FV71, FV72, FV74, FV77	775p
PINCH ROLLER ASSEMBLY	
FISHER	
FVHP420, 520, 530	165p
FVHP615, 618, 620, 622, 710, 711, 715, 716, 720, 721, 722, 725, 730, FVHP810, 830, 840	165p
FVHP905, 906, 907, 908, 910, 911, 915, 916, 918, 970, 975, 980, 990, FVHP 5000, 5005, 5050, 5075, 5100	165p
VBR330, VBS3500, 7000, 7100, 7500, 7600, 9000, 9900	165p
FVHD230, 250, 270, 370, 2000D, FVHP3, 210, 250, 300, 310, 1100, FVHP1200, 1250, 130, 132, 1340, 1340, 1400, 1410, 1440, 1500, 200, FVHP320410, 420, 430, 440, 445, 470, 475, FVSP290S, 495, 2905	165p
FVHD140, FVHD40, FVHD55, FVHP1, FVHP10, FVHP20	165p
FVHD140, 40, 55, FVHP1, 10, 25, 30, 40, 4000, FVHS10, 30	1350p
PINCH ROLLER ASSEMBLY **GOLDSTAR**	
GHV51, 1221, 1232, 1233, 1240, 1241, 1242, 1243, 1244, 1245, 1246,165p	
GHV1247, 1248, 1250, 1266, 1290, 1291, 1295, 1296, 1392, 1393, GHV1891, 1900, 2145, 3000, 3010, 4400, 4410, 51, 8000, 8200, GHV8210, 8215, 8430	
GHVP1240, 1241, 1247, 1248, 1290, 1291, GHVP1295, 1296, VCP4000, 4100, 4130, 4200, 4300, 4301, 4305, VCP4306, 4310, 4311, 4315, 4316, 4320, 4321, 4325, 4326, 4350, GSE1290, 1291, 1295, 1296, 1297, 1891, 1910, 20005, 2000	165p
HITACHI	
VT7, 11, 14, 16, 17, 18, 19, 33, 34, 35, 350, 38, 39, 88, 330, 680, 4200, VT5000, 5030, 5500, 6500, 6800, 7000, 8000, 8300, 8500, 8700, 930, VT9500, 9700, 9900, VM600	165p
VT8, 52, 57, 61, 62, 63, 64, 65, 85, 86, 88, 100, 110, 111, 113, 115, 118, VT120, 122, 125, 128, 130, 135, 138, 145, 150, 168, 170, 175, 220, 225.	
VT250, 255, 258, 260, 400, 405, 410, 413, 414, 415, 416, 418, 420, 425	
VT426, 428, 430, 431, 435, 438, 450, 498, 510, 515, 517, 518, 520, 525,	
VT526, 530, 535, 536, 540, 545, 546, 548, 570, 575, 576, 580, 585, 588	
VT640, 830, VTF660, 665, 70, 770, 774, 775, 780, 785, 860, 861, 865,	
VTL30, 1000, 2000, VTLC50, VTM598, 620, 622, 625, 626, 630, 635	
VTM636, 640, 645, 646, 720, 722, 725, 726, 727, 728, 730, 731, 735,	
VTM736, 740, 745, 746, 748, 753, 754, 820, 821, 822, 825, 830, 831,	
VTM835, 838, 840, 841, 845, 920, 921, 922, 925, 930, 931, 935,	
VTS80, 85, 890, 895VM200, 2300, 2380, 3200, 3280, 500, VMS7200	165p
VT3000	165p
VT410, 420, 428, 430, 450, 498, 518, 520, 522, 530, VTF770, 780,	
VTM598, 622, 722, 740, 748, 753	650p
PINCH ROLLER ASSEMBLY VTF150, 155, 180, 185, 250, 255, 260, 265, 280, 285, 350, 351, 355,	
VTF360, 365, VTM140, 141, 145, 145, 210, 211, 212, 215, 220, 221,	
VTM230, 231, 235, 284, VTS390	165p
HINARI	
V20H, VXL5, VXL6, VXL7, 8, 9, 10, 11, 19, 90, H13V, VTV100, 200	165p
VXL2, VXL3	165p
VXL4, VXL20, VXL35	165p
VTV100, VXL10, VXL11, VLX9, VXL90	700p
PINCH ROLLER ASSEMBLY V20H, VXL5, VXL6 MOD KIT	275p
J.V.C.	
HR2200, 3300, 3330, 3360, 3660, 4100, 7700	165p
HR2650, 7200, 7300, 7350, 7600, 7610, 7650, 7655	165p
HRD110, 111, 120, 121, 140, 141, 142, 143, 150, 152, 156, 157, 158,	
HRD160, 220, 225, 250, 257, 445, 455, 565, 566, 725, 755, HRP50, BP5000, BR7000, BRS611, 811	165p
HRD520, 540, 550, 560, 580, 600, 610, 620, 637, 640, 641, 650, 660,	
HRD670, 720, 730, 740, 770, 820, 830, 840, 860, 870, 880, 910, 960,	
HRD980, HRDX20, 22, 25, HRJ200, 205, 210, 215, 300, 315, 316, 318	
HRJ400, 405, 407, 410, 411, 415, 416, 507, 600, 605, 610, 615, 715, 815	
HRJ97, HRS4700, 5800, 5900, 6800, 6900, SR3200, 330, 368	165p
HRD170, 171, 180, 210, 211, 217, 230, 300, 320, 321, 330, 337, 350,	
HRD370, 400, 430, 440, 441, 470, 500, 530, 700, 750, 950,	
HRS5000, 5500, 8000, 9000, BR7030, 7040, 9060,	
BRS600, 605, 747, 777, 920, 925	165p
HRS10	165p
BP5000, HRD110, 111, 120, 220, 225, 455	1100p
PINCH ROLLER ASSEMBLY HRD140, 141, 142, 143, 150, 152, 157, 158, 160, 565, 566, 725, 755, HRP50	1350p
PINCH ROLLER ASSEMBLY HRD1520, 510, 520, 521, 522, 525, 527, 560, 600, 610, 620, 637, 641, HRD650, 720, 830, 840, 910, HRJ205, HRS5800	350p
PINCH ROLLER ASSEMBLY BR7030, BRS600, HRD160, 170, 171, 180, 190, 210, 211, 217, 227,	
HRD230, 271, 300, 310, 320, 321, 330, 337, 350, 400, 430, 440, 441,	
HRD470, 500, 530, 700, 750, 950, HRS5000, 5500, 9000	875p
PINCH ROLLER ASSEMBLY HRD540, HRD550, HRD580, HRD660, HRD860, HRD960	700p
PINCH ROLLER ASSEMBLY HRJ600, HRJ605, HRJ815, HRS9200	875p
MATSUI	
VX6000, 730, 735, 750, 755, 765, 800, 850, VS888	165p
VX1000, VX2000, VX2500, VX3000, VX6000A	165p
MITSUBISHI	
HS12, 5300, 5424, 5600, HSB11, 12, 16, 21, 27, 31, 32, 41, 51, 52, 82,	
HSE12, 16, 17, 21, 22, 27, 31, 32, 41, 51, 52, 82, HSM1000, 110, 120, 15	
0, 16, 170, 190, 210, 23, 25, 250, 27, 33, 34, 35, 36, 37, 370, 380, 45, 450, 5	
4, 55, 555, 57, 58, 59, 68, HSMS2, 9, HSS11, 14, 15, 17, 19, 25, 5600, HV	
F125, 150, 303, 85, SV8900, 8930	850p
PINCH ROLLER ASSEMBLY PART NO: 948D020010	
HSE11, 12, 16, 17, 21, 22, 27, 31, 32, 41, 51, 52, 5300, 5424, 5600, HSB11, 12, 16, 21, 27, 31, 32, 41, 51, 52, 82, HSM1000, 110, 120, 150, HSM16, 170, 18, 190, 210, 23, 25, 250, 27, 30, 33, 34, 35, 36, 37, 370, 38, HSM380, 40, 45, 450, 50, 54, 55, 555, 57, 58, 59, 60, 68, HSMS2, 9, HSMX1, 18, 19, 2, HSS11, 12, 14, 15, 17, 19, 21, 25, 5600, HVF125, HVF150, 303, 85, SV8900, 8930	165p
HS200, HS300, HS301, HS302, HS303, HS304, HS310, HS320, HS330, HS360, HS700	165p
HS306, HS307, HS318, HS319, HS337, HS338, HS347, HS349, HS400, HS410, HS411, HS412, HS421, HS480, HS710, HSB 10, HSB20, 30, HSE 10, 20, 30, 70	165p
NATIONAL PANASONIC	
NV100, 180, 300, 330PX, 332, 333, 340, 366, 600, 688, 777, 788, 3321, AG6010, 6015, 6100, 6200, 6400, 6800, 7450	165p
NV230, 250, 260, 280, 370, 380, 430, 431, 433, 450, 460, 465, 470, 480	
NV630, 650, 730, 770, 780, 810, 830, 850, 870, 890, 2000, 2010, 3000,	
NV7000, 7200, 7800, 8050, 8150, 8170, 8200, 8300, 8400, 8500, 8600	
NV8610, 8620, NVG11, 14, 16, NVG7, 10, 12, 15, 18, 30, 130, 400,	
AG 1000, 1050, 1200, 1500, 2100, 2200, 6500, 6810, 7500, 7510,	
NVH70	165p
NVG9, NVG120	165p
AG6840, 6720, 7150, 7330, 7350, 7355, 7650, NVH65, 75, NVJ30,NVL20, 23, 25, 28, NVG300, NVF65, NVF70, NVFS1 NVFS 100, NVG 19, 20, 25, 33, 40, 50,	
NVV8000	165p
NVD48, NVD80, NVG21 NVG45	165p
NVJ700PX	165p
NVHD100, NVHD101, NCHD90, NVSD30, NVSD40	1125p
PINCH ROLLER ASSEMBLY AG5150, 5250, 5700, 6024, NVD38, 48, 80, NVF55, 65, 70, 75, 77,	
NVFS1, 100, 200, 88, 90, NVG 19, 20, 21, 22, 25, 28, 300, 33, 40, 45, 46,	
NVG50, NVH65, 75, 77, NVJ30, 33, 35, 37, 40, 42, 45, 47,	
NVL20, 23, 25, 28, NVW 1	350p
PINCH ROLLER ASSEMBLY	
N.E.C.	
N830, 831, 832, 833, 895	165p
PVC2300, 2400, 740, 744, 746, 760, 764, 766	165p
DX1000, 1600, 1800, 2000, 3000, N9012, 9013, 9014, 9016, 9033	
N9034, 9053, 9054, 9055, 9056, 9066, 9096, 9110, 9120, 9510, 9520,	
N9530, 9610, PX 1200	165p
DS6000G, DX4000, N9077	
NS7000	165p
ORION	
VH1, VH2	165p
VC150, 180, VH3, 33, 200, 201, 205, 212, 250, 254, 288, 300, 303, 312,	
VH404, 555, 700, 704, 712, 770, 780, 844, 900, 1000, 2948, 3030, 3312	
VHF2A, VP2948	165p
COMB 15000, 16000, HV03, LVH50, NEVH, NEVHM, NEVHML,	
TVP230RC, VCP, VH04, 30, 103, 300, 358, 360, 362, 400, 416, 512,	
VH530, 532, 535, 536, 600, 630, 635, 640, 666, 730, 735, 744, 774, 790	
VH800, 820, 850, 888, 893, 900, 930, 940, 942, 974, 1012, 1040, 1050,	
VH1060, 1070, VH1100, 1120, 1204, 1440, 1500, 1660, 1800, 2004,	
VH2151, 2308, 22042400, 2500, 2600, 2700, VH2960, 2970, 3050,	
VH3060, 4000, 4008, 4010, 4012, 4015, 4015, 4020, 4300, 5020,	
VP 10, 200, 220, 225, 245, VR821, 925, 1032, 2949, 2959, 2957, 2966, 2979, 2980, VTV300, VXL20, 25, 30	165p
PHILIPS	
VR6460 VR6920	165p
VR2020, VR2021, VR2022, VR2023, VR2024	165p
VR6711	165p
VR6540	165p
DV856, 586, VR702, 703, 6485, 6585, 6589, 6785, 6880, 6948	165p
VR445, VR6442, VR6542, VR6643, VR6843, VR6943, 44SB9	165p
DV464, 662, VR2220, 2300, 2324, 2330, 2334, 2340, 2350, 2414, VR2480, 2485, 2486, 2489, 2490, 2498, 2840, 6462, 6463, 6464, 6560,	
VR6660, 6860, 6861, 6862, 6863	165p
N-1700, VR2870	165p
VR2025, VR6580, VR6581	165p
49SB6, VR3260, 6349, 6448, 6449, 6548, 6648	165p
PRESSURE ROLLER ASSEMBLY PS403-40205	
DV186, 190, VR211, 2115, 212, 213, 223, 286, 291, 292, 311, 312, 313,	
VR3210, 3219, 322, 3229, 323, 535BO, 486, 471, 562, 582, 571, 761,	
VR201, 202, VR203, 302, 303, 305, 6180, 6182, 6185, 6285, 6290,	
VR6291, 6293, 6362, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561	
VR6570, 6581VR6670, 6676, 6710, 6760, 6761, 6762, 6870, 6970,	
VR6975, 86BI, 63SB7, 68SB4, 71SB4, 71SB5, 72SB8, 72SB8, 92SB31, 20DV1, 20DV2, 20RW7, 21DVI, 21DV2, 2SB01, 2SB02, 2SB11, 2SB12, 30DV2, 31DVI, 31DV2, 31DV33SB02, 3SB03, 3SB05 3SB11 3SB12 3SB13	300p
VR231, 232, 332, 422, 4229, 512, 5229, 722, 7229, 723	165p
VR501	PR38 165p
SANYO	
VHR1100, 1110, 1150, 1200, 1300, 1500, 2100, 2300, 2370, 2500,	
VHR2700, 3330, MVR220	165p
VTC5000, 5150, 5300, 5350, 5400, 5500, 6000, 6010, 6500, 9100,	
VTC9300, VTCM10, 20, 11, 21, 30, 31, 40, 50, VPR5800	165p
VHR3100.3300, 3310, 3400, 3500, 3700, 3800, VHRD500, 700	165p
VTC3000	165p
VHR120, 130, 14, 141, 143, 14, 150, 151, 153, 154, 15, 16, 171, 194, 22	
0VHR23, 235, 240, 244, 250, 251, 274, 27, 297, 310, 330, 335, 350, 390, VHR4100, 4105, 4150, 4200, 430, 4300, 4350, 4400, 474, 4770, 5080,	
VHR5100, 5200, 5300, 5350, 5600, 5700, 6850, 7100, 7200, 7250,VHR7260, 7300, 7400, 7440, 7500, 7520, 7530, 7540, 7700, 774, 780,	
0VHR7810, 8000, 8070, 8100, 8200, 8250, 8500, 8800, VHRD4400, 4410, 4500, 4600, 4610, 4710, 4890, 6700, VHRS700	165p
VCR100	165p
VHR120, 135, 150, 190, 4150, 4160, 4350, 5200, 5240, 5350, 7200, 7250, 7260, 7700, VHRD4410, 4610, 4710, 4890, 5450, VHRS700	975p
PINCH ROLLER ASSEMBLY VHR3100, 3200, 3300, 3310, 3400, 3700, 3800, VHRD500, 7000	1350p
PINCH ROLLER ASSEMBLY	
SHARP	
VC200, 381, 383, 384, 385, 386, 388, 390, 393, 800, 2300, 3300, 6000,	
VC6200, 6300, 7300, 7700, 7750, 7800, 8300, 838, 9100, 9300, 9400,	
VC9500, 9600, 9700, 9800	165p
VC300, 387, 402, 471, 473, 477, 481, 482, 483, 486, 488, 496, 500, 571,	
573, 581, 582, 583, 584, 585, 8481, VC5F3, VC5W20E, VCA1031	165p
VC108, 208, 405, 408, 550, 600, 651, 671, 674, 681, 682, 684, 685, 693,	
VC699, 700, 772, 750, 779, 780, 781, 7810, 782, 782MK2, 7822, 783,	
VC785, 786, 787, 793, 800, 7810, 7822, VCT72, VC6F3, VC6V3, VCA 100, 102, 104, 131, 140, 170, 202, 203, 211, 234, 303, 501, 502,	
VCA602, 5011, VCD801, 802, 851, 852, 881, 882, VCM73, VCT73, VCT72,	
VCB361	165p
VC220	165p
VCA10, 30G, 60, 103, 105, 106, 111, 113, 131, 211, 244, 254, 33, 35, 36,	
VCA37, 39, 40, 42, 454, 46, 47, 48, 50, 505. 51, 52, 53, 54, 55, 57, 58, 505,	
VCA60, 605, 615, 62, 63, 67, 68, 1031, 11613,	
VCB311, 320, VCBS97, VCD805, 806, 810, 815, VCH80, 81, 865, 910, VCS 1000, VCT310,	
VCT410, 610, VCT 1314, 5313, VC790	165p
VC780, 790, VCA10, 103, 1031, 105, 106, 211, 244, 254, 255, 30, 35,	
VCA340, 43, 47, 50, 60, 605, 615, VCD806, 815, VCH80, 81, 83, 85,	
VCH865, 87, 910, VCS 1000, VCT212, 310, 410, 510, 610, VCTI314,	
VCTS313	525p
PINCH ROLLER ASSEMBLY **SAISHO**	
VHL3, VR1000, 2000, 2500, 3200, 3300, 3500, 3600, 3650, 3800, VRS4400, VRS5000	165p
VR3400	165p
SAMSUNG	
SV716, 717, VB510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 900,	
V910, V1510, 520, 611, 616, 621, 626, 900, 910, VX510, 520, 616,	
VX617, 619, 626, 627, 629	165p
SVX301, 303, 305, 307, 319, 322, VB710, 713, 750, 770, 971, 8220, VB8225, V1710, 730, 750, 770, 790, 8220, 8225, 970, VX710, 712,	
VX720, 730, 750, 770, 790, 825, 8225, 970, 971, 972, 8220, PX980, 981, 982, SE9000, 9001, SX7120, 7121, 7220, 7221, 7230, SX7301, VK8220,	
VPX31	165p
VX9880	165p
PX31 R, 32R, PXR30, SV80, SX3230, 3231, 3260, 3261, VS390, VX30, 31, 32, 3560, 3561, 370, 375, 380, VXK300, 301, 306, 307, 320, VXK321, 326, 330, 331, 336, 337, 350, 351, 356	165p
PX990, 991, 992, S11230, 1240, SVX4000, 503, 504, 600, SX1230,	
SX1231, 1260, 1261, 1566, V11560, VPK43, VX1230, 1260, 1261, VX1560, 1561, 1850	165p
SONY	
SLC5, 6, 7, SL3000, 8000, 8080, 8200, SLJ 10, SLT6ME, SLT7ME	165p
SLC9, 20, 24, 30, 33, 44, SLHF100, SLF1, 11, 20, 25, 30, 35, 60, 100,	
SLF200, SLF60PS, SLF90E, SLFH150, 850, SLK88, 95, SLT20ME, SLT30ME, SLT50ME	165p
BMC 100, BMC200, BMC500	165p
SLV201, 202, 301, 302, 401, 402, 801, 802	165p
SLV210, 270, 273, 275, 300, 353, 373, 410, 415, 474, 656, 715,	
SLV757, 777	165p
SLV255	165p
SLV275, 282, 315, 325, 353, 363, 373, 410, 415, 416, 474, 625, 656, SLV715, 725, 727, 757, 777, 815, 825, SLVX30, 50, 55	165p
SLV125, 213, 225, 252, 255, 262, SLVXI, 20, 3	165p
SLV215, 216EE, 275, 282, 315, 325, 353, 363EE, 373, 393, 410, 415,	
SLV416EE, 474, 494EE, 555UC, 559, 575UC, 579, 585HF, 595HF, SLV60W, 615, 625, 656, 676UC, 686HF, 696HF, 715, 725, 727, 757.	
SLV767B, 777, 815, 825, SLVE7, 8, 9SLVX30AS,	
SLVX35AF, SLVX50AS, SLVX55DH, SLVX65BR, SVO140, 160	1250p
PINCH ROLLER ASSEMBLY PART NO: X37277701	
SLV210, 212, 270, 273, 275, 285, 300, 310, 335, 425, 427	350p
PINCH ROLLER ASSEMBLY SV6700.8750, 9700, VHR3100, 3200, 3300, 3310, 3400, 3700, 3800, VHRD500, 700	1350p
PINCH ROLLER ASSEMBLY SL100, 200, SLC20, 30, 33, 34, 40, 44, 80, 88, 9, SLF1, 20, 25, 30, 35, 45, SLF60, 65, 73, 90, SLHF100, 150, 950, SLK85, 95, SLO1700, SLS550, SLT0, 30, 50	300p
PINCH ROLLER ASSEMBLY	

VIDEO LAMPS

Models & Description	Order Code	Price
UNIVERSAL VIDEO LAMP 9V 80mV (310mm WIRES)	VL01	25p
PANASONIC VIDEO LAMPS	VL02	30p
SHARP VIDEO LAMPS	VL02	30p
HITACHI 5381682 (VT63, VT64) VIDEO LAMPS	VL04	135p
AKAI IVS10),GRANADA (VHSXJ3), TT (VR3993,3994), JVC (HR2650, 7600, 7610, 7650, 7655), TELEFUNKEN (VR530, 535, 539, 550, 630, 650), THOMSON (V309, 316, 357, VK309, 411,TX8000), FERGUSON (3V31, 8941, 8942)	VL06	40p
AIWA, AKAI, ALBA, AMSTRAD, BLAUPUNKT, FERGUSON, FIDELITY, FISHER, FUJITSU, FUNAI, G.E.C., GOLDSTAR, GRANADA, GRUNDIG, HINARI, HITACHI, ITT, JVC (HRD SERIES), MATSUI, MITSUBISHI, NEC, ORION, NATIONAL, PHILIPS, SAISHO, SALORA, SAMSUNG, SANYO, SHARP, SIEMEN, SONY, TELEFUNKEN, THOMSON,TOSHIBA	VL05	100p
GRANADA (VHSAY3),SHARP (VC200, 381, 384, 385, 386, 388, 390, 393, 9300, 9500, 9700)	VL08	45p
AKAI, GRANADA (VHSTJ2), HITACHI (VT3000), ITT (VR3912, VRP3833), JVC (HR2200, 3300, 3330, 3660), MITSUBISHI (HS200), TELEFUNKEN (VR510, 519, 610), THOMSON (VK300, 305, 306, 3301), FERGUSON (3V00, 16, 22, 24, 3292, 8900, 8901, 8902, 8903, 8909, 5912, 8922, 8925)	VL01	25p
BLAUPUNKT, ORION (VH1, 2A), NATIONAL (NV200,2010, 3000, 7000, 8150, 8200, 8400, 8600, 8610, 8620), SHARP (VC2300, 6000, 6200, 6300, 7300, 7700, 8300)	VL02	30p
AUTHENTIC (N850), DECCA (VR8300), GRANADA (VHSTJ3, WJ1, WJ3), ITT (VR3913, 3914, 3963) JVC (HT7200, 7300, 7350, 7700) TELEFUNKEN (VR450, 520, 529, 540, 549, 620, 640, 920, 1920), THOMSON (V4100, VK308, 309, 312, 410), FERGUSON (3V23, 29, 30, 8923, 8924, 8929, 8930, 8931, 8940)	VL07	40p

VIDEO SERVICE KITS

AMSTRAD
VCR700
Contents
BELT SET. PINCH ROLLER. REEL IDLER. VIDEO LAMP
Order Code: SK41 **£5.50**

FERGUSON & JVC
3V42/43
HRD455/HRD725

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, CLUTCH MECHANISM, TENSION BAND	BELT SET, PINCH ROLLER SUPPLY CLUTCH, TAKE UP CLUTCH
Order Code: SK37 **£16.00**	**Order Code: SK38** **£9.00**

3V58/59/64/65
HRD170/180/210/230/300/320/370/400/430/530/700/750
HRS5000
Contents
BELT SET, PINCH ROLLER, IDLER ARM, TENSION BAND
Order Code: SK44 **£7.00**

3V29/3V30
HR7200/7300/7350
Contents
BELT SET, PINCH ROLLER, TENSION BAND, IDLER TYRES
Order Code: SK05 **£5.00**

3V35/36, 38/39/49
HRD110/111/120/225
Contents
BELT SET, PINCH ROLLER, TENSION BAND, IDLER TYRES
Order Code: SK04 **£5.00**

3V31/3V42
HR7600/7610/7650/7655

Contents	*Economy Kit Contents*
BELT SET, T/U REEL TABLE TYRE. PINCH ROLLER. REEL IDLER. T/U CLUTCH. T/U IDLER. TENSION BAND. VIDEO LAMP	BELT SET, T/U REEL TABLE TYRE. PINCH ROLLER. REEL IDLER TYRE. T/U IDLER TYRE. T/U CLUTCH
Order Code: SK33 **£11.00**	**Order Code: SK34** **£5.00**

3V35/36/38/39/49
HRD110/111/120/121/225

Contents	*Economy Kit Contents*
BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. T/U CLUTCH. T/U IDLER. REEL IDLER. TENSION BAND	BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. T/U CLUTCH. T/U IDLER TYRE. REEL IDLER TYRE
Order Code: SK35 **£10.00**	**Order Code: SK36** **£5.50**

3V29/3V30
HRD7200/7300/7350

Contents	*Economy Kit Contents*
BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. REEL IDLER. T/U CLUTCH. T/U IDLER. TENSION BAND. VIDEO LAMP	BELT SET. T/U REEL IDLER TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. REEL IDLE TYRE. T/U IDLER TYRE. T/U CLUTCH
Order Code: SK31 **£10.00**	**Order Code: SK32** **£5.00**

3V44/45/48/53/54/55/57
HRP50/HRD140/150/158/160
HRD250/257/565/566/755

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND	BELT SET. PINCH ROLLER
Order Code: SK39 **£15.00**	**Order Code: SK40** **£9.50**

FISHER
FVHP905/906/907/908/910/911/916/918

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. IDLER. GEAR IDLER UNIT. TENSION BAND	BELT SET. PINCH ROLLER. IDLER TYRE
Order Code: SK57 **£13.00**	**Order Code: SK58** **£5.00**

FVHP615/618/620/622/710/711/715/716/720/721/722/725/730/830/840

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. IDLER. GEAR IDLER UNIT. TENSION BAND	BELT SET. PINCH ROLLER. IDLER TYRE
Order Code: SK68 **£11.00**	**Order Code: SK69** **£300**

HITACHI
VT11/VT33
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK08 **£5.00**

VT11/VT33

Contents	*Economy Kit Contents*
BELT SET. T/UP REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. FF/REW IDLER. CLUTCH PLATE. TENSION BAND	BELT SET. PINCH ROLLER. FF/REW IDLER TYRE. T/UP REEL TABLE TYRE. SUPPLY REEL TABLE TYRE
Order Code: SK45 **£13.00**	**Order Code: SK46** **£3.75**

VT52/61/62/63/64/65/85/86/640

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, FF/REW ARM. CLUTCH PLATE. TENSION BAND	BELT SET, PINCH ROLLER FF/REW IDLER
Order Code: SK49 **£14.00**	**Order Code: SK50** **£3.00**

VT400/405/410/13/14/15/18/420/25/26/28/430/31/35/48/450/498/510/520/25/26/530/35/36/540/545/46/48/570/75/576/580/85/88
Contents
TIMING BELT. PINCH ROLLER. FF/REW ARM. CLUTCH BASE. TENSION BAND
Order Code: SK52 **£9.75**

VT100/110/111/113/115/118/120/125/128/130/135/138/145/150/175/220/225/250/255/258/260/VTL30
Contents
BELT SET. PINCH ROLLER. FF/REW ARM. CLUTCH PLATE. TENSION BAND
Order Code: SK51 **£14.00**

PANASONIC
NV2000/NV2010NV7000/NV7200/NV7800

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES	BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK03 **£5.00**	**Order Code: SK02** **£5.00**

NV300/NV330/NV333/NV340/NV366
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRE
Order Code: SK01 **£5.00**

NV2000/NV2010

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. FF IDLER. PLAY IDLER. TENSION BAND. VIDEO LAMP	BELT SET. PINCH ROLLER. IDLER TYRE. PULLEY TYRE
Order Code: SK13 **£6.00**	**Order Code: SK14** **£3.50**

NV7000/NV7200/NV7800

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, IDLER UNIT. PLAY IDLER. TENSION BAND	BELT SET, PINCH ROLLER IDLER TYRE. CLUTCH TYRE
Order Code: SK11 **£8.50**	**Order Code: SK12** **£3.25**

NV300/NV330/NV333/NV340/NV366

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, IDLER UNIT. PLAY IDLER. TENSION BAND	BELT SET, PINCH ROLLER IDLER TYRE. PLAY IDLER
Order Code: SK15 **£7.00**	**Order Code: SK16** **£3.25**

NVG7/NVG9/NVG10/NVG11/NVG12/NVG14/NVG15/NVG16/NVG18/NVG30/NVG120/NVG130/NVG400/NVH65 (PX/AC)/AG1810 (P/K)

Contents	*Economy Kit Contents*
LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND	LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER. TYRE
Order Code: SK27 **£6.00**	**Order Code: SK28** **£3.00**

NV332

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYRE	BELT SET, PINCH ROLLER PLAY IDLER TYRE. FF/REW IDLER TYRE
Order Code: SK29 **£12.00**	**Order Code: SK30** **£5.10**

NV230/250/260/280/430/450/460/470/650/810/890/AG1200PK/AG1500PK

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, IDLER. TENSION BAND	BELT SET, PINCH ROLLER IDLER TYRE
Order Code: SK23 **£6.00**	**Order Code: SK24** **£3.25**

NV600/NV688

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, PLAY IDLER. FF/REW IDLER, TENSION BAND	BELT SET, PINCH ROLLER PLAY IDLER TYRE. FF/REW IDLER TYRE
Order Code: SK25 **£12.00**	**Order Code: SK26** **£6.00**

NV730/NV770

Contents	*Economy Kit Contents*
SLOT IN BELT. LOADING BELT PINCH ROLLER. IDLER UNIT. TENSION BAND	SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER TYRE
Order Code: SK19 **£5.00**	**Order Code: SK20** **£3.00**

NV370/NV380/480/630/780/830/850/AG2100PK/AG2200PK

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, IDLER. TENSION BAND	BELT SET, PINCH ROLLER IDLER TYRE
Order Code: SK21 **£5.00**	**Order Code: SK22** **£2.75**

NV777/NV788

Contents	*Economy Kit Contents*
BELT SET, PINCH ROLLER, IDLER UNIT. TENSION BAND	BELT SET, PINCH ROLLER IDLER TYRE
Order Code: SK17 **£6.00**	**Order Code: SK18** **£4.00**

SHARP
VC381

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. REEL IDLER. TENSION BAND. VIDEO LAMP	BELT SET. PINCH ROLLER REEL IDLER TYRE
Order Code: SK47 **£8.00**	**Order Code: SK48** **£3.25**

VC500/VC571/VC581/VC582/VC583/VC584/VC5F3

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. REEL IDLER. TENSION BAND	BELT SET. PINCH ROLLER REEL IDLER
Order Code: SK60 **£9.50**	**Order Code: SK61** **£5.00**

VC781/VC7810/VC7822/VC785/VC786/VC793/VC800/VCA100/VCA102/VCA104/VCA202

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. REEL DRIVE UNIT. TENSION BAND	BELT SET. PINCH ROLLER REEL DRIVE UNIT TYRE
Order Code: SK64 **£13.50**	**Order Code: SK65** **£3.75**

VC681/VC682/VC684/VC685/VC693/VC699/VC6F3/VC700

Contents	*Economy Kit Contents*
BELT SET. PINCH ROLLER. REEL DRIVE UNIT. TENSION BAND	BELT SET. PINCH ROLLER REEL DRIVE UNIT TYRE
Order Code: SK62 **£13.50**	**Order Code: SK63** **£5.00**

FOR MORE DETAILS OF OVER 500 TYPES OF SERVICE KITS . . .
PLEASE RING US!

SPECIAL OFFERS!
See Page 814

REPLACEMENT VIDEO CASSETTE HOUSINGS

Name	Models	Code	Price
AKAI	VS35, VS53, VS55, VS56, VS75	CH18	3200p
GRANADA	VHSDP1	CH05	1100p
	VHSYJ2	CH01	2800p
GOLDSTAR	GHV1290P, 1291P, 1295P, 9400, 73401, GSE1295P, GSE1891P, 20001Q, 20051Q, VCP4200, 4300, 4301, 4305, VCP4306, 4311, 4315, 4316, 4320, 4321, 4325	CH25	2000p
	GHV51, 1221, 1232, 1240, 1241, 1242, 1244, 1246, 1248, GHV8000, 8200	CH26	2900p
FERGUSON & J.V.C.	3V38, 3V39, 8943, 8944, 8951, 3V35, 3V36, 3V49, HRD 110, 111, 120, 121, 225	CH01	2800p
	3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V57, 8945, 8947, 8948, HRD 140, 141, 150, 157, 158, 160, 250, HRD257, 455, 565, 566, 725, 755	CH02	2800p
	8948, 8950, FV10B, 12L, 13H, 14T, 20B, 21R, 22L, 26, 395, HRD230, 430, 530	CH03	2800p
	3V58, 3V59, 3V64, 3V65, FV11R, 8950, 8951, HRD170, HRD180, HRD370	CH04	2800p
	FV31R	CH19	4300p
	HRD515, 520, 527, 540, 550, 580, 600, 610, 620, 660, 670, HRD830, 840, 850, 860, 4050, 6600, FV37H	CH20	2200p
	HRD540, 580, 830, 860, 910, 960, HRD970, HRDX20,		
FERGUSON	FV57H	CH27	2400p
I.T.T.	VR3605, VR3905	CH01	2800p
	VR3916, 3926, 3946, 3948, 3976, 3986, 3995, 3997, 6948	CH02	2800p
	VR3916, 3926, 3946, 3948, 3976, 3986, 3995, 3997, 6948	CH02	2800p
NATIONAL PANASONIC	NV730	CH06	4300p
N.E.C.	N830EG, N831EG, N831EG, N832, N833EG	CH01	2800p
	N895	CH02	2800p
PHILIPS	CASSETTE LIFT ASSEMBLY (69120366) DV186, 190, 286, 471, 562, 761, VR6180, 6182, 6185, 6285, VR6290, 6291, 6293, 6362, 6367, 6393, 6467, 6468, 6470, VR6561, 6670, 6760, 6761, 6870, 6970	CH05	1100p
	VR6443	CH22	2900p
	VR6448	CH23	2500p
	49SB6	CH24	2500p
SHARP	VCA100, VCH851, VCH852	CH22	2900p
	VCA103, 103GV, 106, 106GVM, 254GVM	CH23	2500p
	VCS211, 244, 5055, 605, VCB230, VCD806G, 810G, VCT212, 310, 410G, 610	CH24	2500p
TELEFUNKEN	VR2970	CH02	2800p
THOMSON	V320, 321, 323, 326, 4200, 4300	CH01	2800p
	V342, 343, 352, 353, 360, 364, 368, 4210, 4230, 4260, 4400, V5500, 6000, 8540	CH02	2800p
TOSHIBA	V55, V57	CH01	2800p
	V65, V66	CH02	2800p

AMSTRAD MOD KIT
FITS :
VCR 4500 , 4600 , 4700 , 5200 , TVR 1,2,3
PRICE : £2.75 + VAT each

MODE SWITCH

NV2000, 2010, 7000, 7200, 7800 (VS50048)	
NV230, 260, 430, 810, 870, 2300, 4300	**£3.50**
(VSS0110)	**£2.25**
NV830 (VSS0091)	**£2.10**
NV300, 333, 340, 366, 688, 777, 778	
(VSS0060	**£3.75**
NVG21, 25, NVH65, NVD80 (VSS0175A)	**£2.00**

AUDIO CONTROL HEADS

AMSTRAD ORIGINAL NO: 150751
Used on: AMSTRAD TVR1, 2, 3, VCR4600, 4600MKII, 4700, FUNAI VS2, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000
Also fits: FIDELITY, FUNAI, HINARI, PROLINE, SCHNEIDER, TOWADA, UNIVERSUM **ORDER CODE: AH01 PRICE: 1350p**

AMSTRAD ORIGINAL NO: 153134
Used on: AMSTRAD DD8900, 8904, VCR2000, 6000, 6100, 8600, 8602, 8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 8244
Also fits: ANTECH, BONDSTEC, CASIO, CROWN, FIDELITY, GOLDHAND, GRANADA, HINARI, MARQUANT, OMEGE, PROFEX, SCHNEIDER, SEG, SENTRA, SHINTOM, TASHIKO, TATUNG, TOWADA, UNIVERSUM **ORDER CODE: AH02 PRICE: 1450p**

Replacement Audio Control Video Sound Head for National Panasonic

PART NUMBER	MODELS	PRICE
VBR 0091	NVG7 etc	875p
VBR0050	NV300, NV340 etc	875p
VBR0061	NV777 etc	875p
VBR0103A	NV250, NV450 etc	625p
VBR0125		625p

VIDEO TOOLS

VIDEO CLEANING STICKS

Price 17p each 15p each pack of 10pcs
13p each pack of 25pcs
Order Code: SP14

VIDEO MAINTENANCE TOOLS

Set of 8 Allen keys packed in a plastic wallet
Order code: TOOL 9, Price 125p
Specifically designed for video maintenance

UNIVERSAL HEAD EXTRACTOR

Hand tool designed for extracting hard to remove heads without damage to either the head or the mounting assembly. Adjustable so as to suit various heads.
Order code: TOOL 8, Price 600p

VCR ALIGNMENT KIT

CONTAINS: SET OF 7 HEAD & TAPE PATH ALIGNERS
- RCA TYPE AUDIO & CONTROL HEAD POSITIONING TOOL
- RCA ADJUSTMENT TOOL FOR TAPE GUIDE POSTS
- RCA TYPE BACK TENSION TOOL
- TENSION ADJUSTMENT TOOL FOR VARIOUS USES
- VCR ADJUSTMENT TOOL

SET OF 8 ALLEN KEYS
0.77mm 0.90mm
1.27mm 1.50mm
1.60mm 2.00mm
2.40mm 3.00mm

3 REVERSIBLE SCREWDRIVERS **CIRCLIP PLIERS**
SPRING HOOK **MICRO SCREWDRIVER**
VCR HEAD EXTRACTOR
Order code: TOOL 10, Price 2900p

TRANSPARENT REPAIR/ADJUSTMENT CASSETTE

This transparent videocassette replaces a normal videotape during measurements, adjustments and inspection. The mechanical parts come into sight and become accessible.
Order code: TOOL 23, Price 500p

BACK UP BATTERIES

PHILIPS
Part Nos: 138 - 101138, 138 - 10313 1.2v 90mAH
Order Code: BB01 Price: 75p
Part Nos: 138 - 10229, 2.4v 100mAH
Order Code: BB02 Price: 135p

FERGUSON
Part No: 00E6 - 067 - 001 1.2V 100mAH
Order Code: BB03 Price: 90p
Part Nos: 00E6 - 606 - 8001 2.4V 100mAH
Order Code: BB04 Price: 150p

SATELLITES

MAKE & MODEL	CODE	PRICE
PACE PRD800, PRD900	SATPSU1	650p
PACE SS9000, 9200, 9010, 9210, 9220	SATPSU2	650p
AMSTRAD SRD510, SRD520	SATPSU3	650p
AMSTRAD SRD500	SATPSU4	650p
AMSTRAD SRX340, SRX345, SRX350	SATPSU5	650p
PACE D100/150	SATPSU6	650p
CHURCHILL D2MAC	SATPSU7	650p
PACE MSS100	SATPSU8	730p

MAKE & MODEL	CODE	PRICE
PACE MSS200/300 APPOLL	SATPSU9	900p
PACE MSS500/1000	SATPSU10	1230p
FERGUSON SRD4	SATPSU11	835p
ECHOSTAR SR5500	SATPSU12	1735p
ECHOSTAR 6500/7700/8700	SATPSU13	3125p
AMSTRAD SRD600	SATPSU14	3125p
MIMTEC (Surensen)	SATPSU15	775p
AMSTRAD SRD700, SR950, SRX100, 301, 501, 502, 1002, 2001, SRD2000 SAT250	SATPSU16	730p

SATELLITE TUNERS

PACE PRD800/MSS200 2Ghz (221-2077062)
ORDER CODE: TUNER01 PRICE: 1650p + VAT

PACE PRD900/MSS1000 2Ghz (221-21770112)
ORDER CODE: TUNER02 PRICE: 1650p + VAT

SWITCH MODE TRANSFORMERS

PACE 9000
ORDER CODE: PACE9000 PRICE: 800p

PRD800/PRD900
ORDER CODE: PRD800 PRICE: 550p

SATMETER

The Satmeter is a professional portable satellite strength meter designed for the installation and maintenance of satellite TV systems. The Satmeter can be used as stand alone with powering the LNB as well as in loop.
Through operation with satellite RX powering the LNB.
* Acoustical signal: On signal strength *LED indicator: Vert/Hori
* Frequency Range: 900 to 2050 Mhz *Input impedence: 70 Ohm
* Power amplifier: 18db *Detection Range: –60 to –10 DBM
* Max. input signal: –10 DBM

ORDER CODE: TOOL22 PRICE: 8500p

REPLACEMENT TV SWITCHES

GRUNDIG

PART No: 29703, 29102
USED ON:
C7500, C8500. C8502, C8712 . . .ETC
Order Code: SW1 Price: 140p

PHILIPS

USED ON:
K30, K35, K40, KT3, KT4
Order Code: SW13 Price: 95p

SONY

USED ON:
KV1612, KB1612, KV1614, KV2052, V2056
KV2062, KV2067, KV2212 . . .ETC
Order Code: SW5 Price: 150p

USED ON:
KV1400, KV1440, KV2040, KV2060
(POWER SWITCH 26mm)
Order Code: SW12 Price: 125p

SONY

USED ON:
KV2020
(POWER SWITCH 21mm +Remote)
Order Code: SW6 Price: 200p

SONY 2 PIN FUNCTION SWITCH

Order Code: SW9 Price: 35p

INTRODUCING A NEW PRODUCT

Rough Touch

SCRUBS

Heavy Duty Waterless Hand Cleaner Towel

- As you have Probably noticed from experience that when you've got dirty or greasy hands there is never any water or soap around.
- We now have in stock an elegant solution to clean your hands , a heavy duty waterless hand cleaner towel called *"SCRUBS"*.
- *"SCRUBS"* cleans the filthiest hands without water or soap , where and whenever wanted .
- *"SCRUBS"* will remove Grease , Lubricants , Adhesives , Oils , Tar , Asphalt , Inks Wax and many other difficult to remove soils.
- The usage of *"SCRUBS"* is unlimited , it can also be used to clean tools and surfaces as it does not affect metals or synthetic materials and is not combustible.
- Just remember No Rinsing , No Drying , No Residue.
- *"SCRUBS"* are now available from GRANDATA in 3 types of packages containing 10 , 36 or 72 of these handy , multifunctional towels.

PACK OF 10 – £2.50 + VAT	PACK OF 36 – £6.25 + VAT	PACK OF 72 – £10.00 + VAT
Postage: £1 +VAT	Postage: £3 +VAT	Postage: £5 +VAT

VOLTAGE TESTER

A terminal screwdriver incorporating continuity & voltage with Euroslot

ORDER CODE: TOOL11 **PRICE: 220p**

SPRING HOOK

Spring Hook, to unlock springs in audio tape recorders & VCRs

ORDER CODE: TOOL20 **PRICE: 265p**

FAULT FINDING / COMPARISON BOOKS

Satellite Fault Finding Guide Issue 1. Listing about 1,000 faults for over a range of 24 different brands. Order Code: BOOK05.
Price £8.50 – No VAT.

Video Recorders Edition 4
Lists more than 4500 faults for 43 different brands
Price £12.75 – No VAT. Order Code: BOOK01

TELEVISION Edition 6
Lists more than 8,450 faults with 460 pages covering 58 different brands
Price: 1600p only – no VAT. Order Code: BOOK02

Satellite Repair Manual Edition 4

A comprehensive guide to receiver reviewing, featuring stock faults and installation tips.
Price £15.00 Only No VAT Postage 100p
Order Code: BOOK03

SEMICONDUCTOR COMPARISONS 1997/8
Listing more than 31,600 Semiconductors with suitable alternative complete with descriptions and base information.
Price: £15.50 – No VAT. Order Code: BOOK04

SEMICONDUCTOR COMPARISONS 1997
The new 1997 Jaeger Semiconductor with 952 pages packed with information on over 80,000 semiconductors in much greater detail plus marketing data on SMD devices and a separate generic table of all type designations.
Price: £40.00 only – No VAT (+ £5 Postage). Order Code: BOOK06

SERVICE AIDS

DESCRIPTION	VOLUME	CODE	PRICE
VIDEO HEAD CLEANER	75ML	SP01	180p
SWITCH CLEANER	176ML	SP02	180p
SILICONE GREASE	200ML	SP03	210p
FREEZE IT	170ML	SP04	320p
FREEZE IT	400ML	SP16	600p
FOAM CLEANER	400ML	SP05	200p
ANTI-STATIC	150ML	SP06	190p
AEROKLEANE	135ML	SP07	220p
AERO DUSTER	150ML	SP08	310p
AERO DUSTER	400ML	SP17	550p
PLASTIC SEAL	200ML	SP09	250p
GLASS CLEANER	250ML	SP10	160p
COLDKLENE	250ML	SP13	230p
EXCEL POLISH 80	250ML	SP18	150p
ADHESIVE 120	400ML	SP19	190p
LABEL REMOVER 130	200ML	SP20	240p
REFURB 140	400ML	SP21	240p
TUBE SILICON GREASE	50 GRAMMES	SP11	210p
TUBE SILICON SEALANT WHITE	75ML	SP22	280p
TUBE SILICON SEALANT CLEAR	75ML	SP23	280p
TUBE HEAT SINK COMPOUND	25 GRAMMES	SP12	150p
DRIVE CLEANER	200ML	SP24	150p
SCREEN CLEANER	200ML	SP25	150p
COMPUTER CARE KIT	–	SP26	2100p

All the above items are manufactured by Servisol

If you purchase more than one Servisol Product, postage & package will be charged as follows:
300p for 5 cans **450p** for more than 5 cans

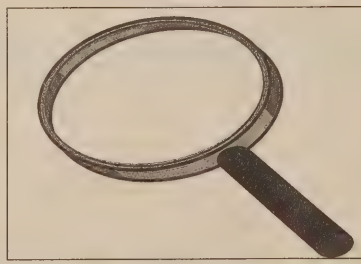
SOLDERING ACCESSORIES

DESCRIPTION	CODE	PRICE
ANTEX SOLDERING IRONS		
25 WATT 240 VAC (XS25W 240V)	S101	900p
15 WATT 240 VAC (XS15W 240V)	S102	900p
25 WATT SPARE ELEMENT	S103	450p
15 WATT SPARE ELEMENT	S104	450p
SOLDERING STAND & SPONGES		
SOLDERING STAND (MADE BY ANTEX)	S108	350p
SPARE SPONGE	S109	55p
SOLDER		
18 SWG 500 GRAMMES	S110	500p
20 SWG 500 GRAMMES	S111	650p
22 SWG 500 GRAMMES	S112	700p
DESOLDERING AIDS		
SOLDER MOP STANDARD GAUGE 1.2MM X 1.5M	S107	80p
SOLDER MOP 1.2MM X 10M	S113	400p
DESOLDERING PUMP	S105	320p
SPARE NOZZLE	S106	60p

I.C. PROTECTORS

ICPF10, ICPF15, ICPF20, ICPF25, ICPF38, ICPF50, ICPF75
ICPN5, ICPN10, ICPN15, ICPN20, ICPN25, ICPN 38, ICPN50, ICPN75

PRICE: 30p EACH ONLY



CAN'T FIND WHAT YOU'RE LOOKING FOR?

RING US...AS THIS IS ONLY A SELECTION OF THE ITEMS THAT WE STOCK

GRANDATA LTD **Tel: 0181 900 2329** **Fax: 0181 903 6126**

GRANDATA LTD — Tel: 0181 900 2329

CASSETTE DC MOTORS

6V MOTOR	170p
9V MOTOR	170p
12V CW MOTOR	170p
12V CCW MOTOR	170p
13.2V MOTOR	290p

CASSETTE TAPE HEADS

MONO HEAD	90p
STEREO HEAD	110p
MINI HEAD	150p
AUTO REVERSE HEAD	200p

CD PICK UPS

Models & Description	Order Code	Price
AIWA		
XC007	KSS151A	1900p
DX-990A, DX-DIA	KSS152A	1600p
CXL60, CXL66G, CXL80, CXN3100, CXN320, CXN3300, CXN360, CXN400, CXN430, CXN540, CXN550G, CXN990, CXN999, CXNV20, CXSL70, DXZ9100M, FDN636, FDN6636, FDN939, LCX60, LCX66G, LCX70M, LCX80, M7400, M75, NSX320, NSX360, NSX400, NSX430, NXS990, NSX992, NSX999, NSXD636, NSXD939, NSXV20, SXFN550.SXFN520, XC300, XC550, XC750, XC900, XC950, XCN992, XG320, XG360, XG400, XG990, ZD3000M, ZD3100M	KSS152A	1600p
CXAP1, CXL7, CXL8G, CXLC50P, CXZ58, DXM740, DXM75, DXM76, DXM77, LCX50, LCX7, LCX8G, LCXAP1, XC002, XC004, XC005, XC777	KSS210B	2000p
XP31, XP33, XP55, XP80G	KSS220A	2500p
XP6.XP7	KSS331A	3400p
AKAI		
CD73, DC93	KSS151A	1900p
CD25, CD26, CD27, CD32, CD36, CD37, CD52, CD55, CD57, CD650, CD670, CD69, CD750, CD79, CDM480, CDM600, CDM670, CDEM770, CDM959, MX550, MX570, MX650, MX670, MX750, MX950	KSS210A	2000p
DENON		
DCD1500II, DCD1520, DCDE3520	KSS151A	1900p
DCD1400, DCD600, DCD800	KS152A	1600p
DCD1420, DCD520, DCD610, DCD620, DCD660, DCD810, DCD820, DCD860, DCD910, DCD920	KSS210A	2000p
DCD1015, DCD1290, DCD2060, DCD2060G, DCD315, DCD480, DCD580, DCD615, DCD715, DCD825, DCD890, DCD895, DN2000F	KSS240A	2600p
GOLDSTAR		
CD952A, CD952AJ, CD952LJ, CD952SJ, FFH101KL, FFH101WL, FFH222A/L, FFH272L, FFH333L, FFH373K, FJ606, FR606L	KSS210A	2000p
CD320A/L, CD630S/L, FFH212A/L.FFH212E	KSS210B	2000p
GRUNDIG		
CD360, CD435	HOPM3	2150p
CCD300, CD101MCD904, MC10, NEW ORLEANS CD	KSS210A	2000p
KRCD100, RR1900CD, RR3100CD, RR4000CD, RR610CD, RR700CD	KSS210B	2000p
CDP60, CDP90	KSS220A	2500p
CDP65	KSS331A	3400p
CD905	OPTIMA5	3600p
HITACHI		
DAW560	HOPM3	2150p
FX-10	KSS210A	2000p
AXC10	KSS210B	2000p
J.V.C.		
1990-1992, LATE 1987-1988 – XLE300BK, XLE31BK, XLE51BK, XLE900BK, XLME91BK, XLV101BK, XLV211BK, XLV222BK, XLV311BK, XLV333BK, X-Z1010TN, XLZ411BK, XLZ444BK, XLZ555BK, XLZ611BK	OPTIMA3	4000p
CDRADIO CASSETTE, MINI SYSTEMS – MODELS 1990-1992	OPTIMA4S	5000p
CA-C33, CA-MX30BK, CA-MX33BK, UX-A5, UX-A6, XL-M309, XL-M403BK, XL-M408, XL-M409, XL-M504BK, XL-M505TN, XL-M508, XL-M509, XL-M705TN, XL-V131BK, XL-V151TN, XL-V221BK, XL-V241TN, XL-242BK, XL-V251TN, XL-V252BK, XL-Z1050TN, XL-Z551TN, XL-Z552BK	OPTIMA5	3600p
1994 ONWARDS – CAE48BK, CAMCG7, CAMXG9, CAS20BK, CAS30BK, VAS50, CAS60RBK, MXS20, MXS30, MXS60, PCX105, PCX130, PCX95, RCX230, RCX320, RCX520, RCX620, RCX720, UXA4, UXA5, UXA55, UXC7, UXT1, UXT3, XLF115, XLF116, XLF215, XLF216, XLMC100/M, XLMXG7, XLMXG9, XLV163TN, XLV164BK, XLV174, XLV263TN, XLV264BK, XLV274BK, XLZ463TN, XLZ464BK, XLZ574, XLZ674, XTMXG7, XTMXG9, XTS60	OPTIMA6S	3300p
KENWOOD		
DP47, DP660SG, DP8020, DP87, L1000D	KSS152A	1600p
DP1030, DP1510, DP2010, DP2030, DP3010, DP3030, DP3050, DP4030, DP491, DP5010, DP5030, DP5040, DP520, DP7030, DP7040, DP7050, DP730, DP920, DP930, DP950, DPM650,DPM6630, DPM7730, DPM850, DPM991, DX6620, M225, M25, M450, M850, PD3030, PDM991, RDX25, RXDC3, RXDC3L, UD202, UD302	KSS210A	2000p
DPC42, DPC72, DPC77, DPC80, DPC92	KSS220A	2500p
DP1050, DP2050, DP3060, DP501, DP5060, DP722, DP76, DPB5, DPB9, M77A, PD3060, UD502, UD70, UD701, UD90, XE5	KSS240A	2600p
DPC321, DPC521, DPC531, DPC631K, DPC721, DPC731	KSS331A	3400p
DP1060, DP2060. PART No: RCTRH8136AFZZ	RH8136A	4500p
PANASONIC		
SLP177A, SLP202A, SLP212A, SLP222A, SLP277A, SLP377A, SLP477AK, SLP477A, SLPG100A, SLPG200A, SLPG400A, SLPG500AK, SLPG500AS, SLPJ24A, SLPJ26A, SLPJ27A, SLPJ28A, SLPJ325A, SLPJ325A, SLPJ37A, SLPJ38A, SLPJ46A	691-30209	5500p
SAD30, SLCH9, SLP150, SLP170, SLP200, SLP202, SLP222, SLP230, SLP250, SLP333, SLP370G, SLP400C, SLP555, SLP777, SLP999, SLPA10, SLPC20, SLPC25, SLPJ25, SLPJ26, SLPJ27, SLPJ37, SLPJ45, SLPK25, SLPK26, SLPS50, SLPS70, SLPS700, SLPS840, SLPS900	SOAAD70A	2350p
PHILIPS		
AZ8304, CD070, CD080, 690, 910, 920. PART NO. 4822-691-20768	4822-691	3100p
CD100, CD130, CD1380, CD1482, CD200, CD204, CD210, CD300, CD303, CD304, CD380, CD480, CD482, CD500, CD502, CD582, CD583, CD584, CD610, CD620, CD630, CD780, CD781, CD782, CD840, CD883, CD960, CDF104, CDM4/19, FCD185	691-30209	5500p
AS440, AS445, AS540, AS640, AZ8048, AZ8640, CD070, CD080, CD091, CD163, CD165, CD690, CD710, CD720, CD732, CD740, CD750, CD910, CD920, CD935, FW17, FW21, FW26, FW330, FW36, FW360, FW380I, FW40, FW41, FW46, FW56, FW66, FW68	CDM12.1	2200p
CD1210/40	CDM12.4	2200p
AZ8006	KSS210B	2000p
FW11	OPTIMA6S	3300p
PIONEER		
PDM400, PDM410, PDM500, PDM510, PDM600, PDM610, PDM700, PDM710, PDM730, PDT303, PDT403, PDT503, PDX940M, PDX950M. PDZ560T, PDZ72T, PDZ73T, PDZ81M, PDZ82M, PDZ83M, PDZ960M, XDZ53T, XDZ54T	KSS151A	1900p
N32, N90M, , PD101, PD201, PD32, PD41, PD4500, PD4700, PD52PD5700, PD65,I PD6500, PD6700. PD7700, PD8700, PD970, PDCP420, PDCP520M, PDCP520T, PDJ400T, PDJ500T, PDJ800M, PDJ900M, PDM430, PDM450, PDM550, PDM630, PDM650, PDM750, PDM901, PDP710T, PDP720T, PDP910M. PDP920M, PDS501, PDS601, PDS701, PDS701G, PDS901, PDT310, PDT510, PDZ, PDZ570T, PDZ74T, PDZ84M, PDZ970M, PXA1349, S125CDT, S135CDT, S303CDM, S303CDT, S505DM, S505DT, S707DM, S707DTM, S909DM, S990DT, XCP410M, XCP410T, XDZ54T, XDZ55T, XDZ64M, XDZ84T, XRP310, XRP320	PEA1030	5300p
PDM400, PDM410, PDM500, PDM510, PDM600, PDM610, PDM700, PDM710, PDM730, PDT303, PDT403, PDT503, PDX940M, PDX950M, PDZ560T, PDZ72T, PDZ73T, PDZ81M, PDZ82M, PDZ83M, PDZ960M, XDZ53T, XDZ54T, XDZ55T, XDZ62, XDZ62M, XDZ630, XRZ82	PWY1009	4800p
SAMSUNG		
CD20	HOPM3	2150p
CD1200, CD1310, SCM-6000, SCM6900	KSS210A	2000p
RCD1200, RCD1300, RCD1350, RCD1600, RCD2600, RCD990, RCD995, SCM6900	SOH90T4N	3600p
SANYO		
DCFS3, DCT55, DCX502, DCX701, DCX702, DCX802, DCX891, DCX891N, MCDZ10. PART No. 6142186855	614218	2300p
DCFS5, MCD450K, 660K, MCDZ30L, 60F. PART No. 6142205006	614220	5800p
DCX1000MD, DCX1003, DCX900MD, DCX903, DCX915	KSS210A	2000p
DCD10, DCD11U, DCD20, DCD30, DCD30AT, DCD6, DCD8U, DCMS1, DCX110, DCX120, DCX210, DCX220, DCX993, DCX994, MCDMS40L, MCDMS50L, MCDMS660L, MCDZ1L, MCDZ2L, MCDZ3L. PART No. 6142391303	614239	3300p
DCD12. PART No. 6450055966	645005	3700p
MCDZ31L, MCDZ41L, MCDZ61L, MCDZ71L	KSS210B	2000p
SHARP		
CD-111, CD-301, CD-302, CD-304, CD-310, CD-C3, CD-L700, CD-L800, CD-U1, CD-U10, CD-X10, CD-X12, CD-X15, CD-X16, CD-X17, CD-X20, CD-X9, CKL650, CMS95CD, DX-150, DX-160, DX-450, DX-460, DX-461, DX-650, DX-660, DX-999, DX-A3, DX-N45, DX-R554, DX-R7, DX-R75, DX-R750, DX-R77, DX-R770, DX-R820, DX-R840, DX-Z100, DX-Z1000, DX-Z1500, GFCD55, QT-30CD, QT-33CD, QT-350CD, QT-37CD, QT-38CD, QT-CD20, QT-CD33, RS95, SC-77CD, SC-99CD, SC-RS95, SG-A1, SG-W1CD, SG-W2CD, SYS302, ZCD7CD. PART No. RCTRH8122AFZZ	RH8122A	5750p
QT-50CD, QT-60CD, QT80CD. PART No. RCTRH8124AFZZ	RH8124AF	2900p
DXR-840B. PART No. RCTRH8130AFZZ	RH8130AF	2900p
CDS380E, 360H, 370, 450H/E, CMS150CDH, CMSR400CDH, CP150, CPR400, CPS360, 370. PART No. RCTRH8136AFZZ	RH8136AF	4500p
SONY		
KSS240A	KSS240A	2600p
KSS121A	KSS121A	3500p
KSS151A	KSS151A	1900p
KSS210A	KSS210A	2000p
KSS210B	KSS210B	2000p
KSS220A	KSS220A	2500p
KSS331A	KSS331A	3400p
KSS360A	KSS360A	2600p
TECHNICS		
SLP200, SLP230, SLP250, SLP333, SLP555, SLP777, SLP999,SLPA10, SLPC20, SLPJ25, SLPJ45, SLPS700, SLPS900	SOAD70A	2350p

REMOTE CONTROLS

Description	Code	Price
AKAI		
RC-V10A	RC876	750p
RCV 37 B	RC891	750p
V25A	RC896	750p
DECCA		
RC70	RC894	750p
FISHER		
RC905B	RC879	750p
GRANADA		
UNIVERSAL TEXT	RC309	750p
MK4 TEXT, 70155G, 70115G, 70133G		RC880 750p
95288E	RC882	750p
94490D	RC884	750p
GRUNDIG		
TP160E	RC107	900p
TP200, TP300	RC380	750p
TP400	RC401	675p
TP590-600	RC600	750p
TP390, TP610	RC610	750p
TP621	RC612	800p
TP630, TP650	RC650	750p
TP666	RC660	750p
TP661	RC661	750p
HITACHI		
CLE800-CLE830	RC140	700p
A617402/655602	RC1920	800p

Description	Code	Price
A512120/230	RC900	750p
A514790	RC901	750p
A5088470	RC902	800p
A518612	RC903	750p
SCL002	RC904	750p
C2096	RC905	800p
A511940	RC906	750p
655602H	RC1920	800p
ITT		
IFB13, 14, 15	RC143	800p
FS4	RC148	750p
RG305	RC305	675p
RG306	RC306	750p
FS9/1-10/1	RC307	750p
VS5 RUK	RC308	750p
VS4-1	RC308	750p
MULTICONTROL (17C20)	RC311	750p
LOEWE		
DC11	RC146	800p
MATSUI		
010270601	RC889	750p
VX770	RC892	750p
NOKIA		
SATELLITE	RC550	750p
ORION		
RC53	RC892	750p

Description	Code	Price
PANASONIC		
EUR51200	RC200	800p
TC2200	RC204	750p
VSQ0357/NV730	RC202	750p
TNQ1621	RC203	750p
PHILIPS		
RC5002,5154	RC134	750p
KT3 NON TEXT	RC135	750p
69117032	RC178	800p
69117194	RC180	750p
RC5991-UNIV	RC300	580p
RC38	RC301	750p
KT3 TEXT	RC5301	750p
RC5352	RC5352	750p
RC5375	RC5375	750p
RC5 STANDARD	RC300	580p
RC5903	RC5903	700p
SALORA		
SERIES L	RC190	750p
86173	RC882	750p
SANYO		
RC218, RC222, RC228, RC238	RC140	700p
JXGE	RC878	800p
JXDE	RC884	750p
VHR2300	RC890	750p
RC628	RC865	750p
SHARP		
G0121CESA, 123CESA, 204, 251	RC140	700p

Description	Code	Price
SONY		
RM604, RM605, RM606	RC140	700p
32 CHANNEL	RC140	700p
RM613	RC141	750p
RM632, RM636	RC160	675p
TATUNG		
FXA	RC877	750p
RC70	RC883	750p
FX70 FASTTEXT	RC894	750p
TELEFUNKEN		
FB632	RC632ST	750p
FB639	RC639	750p
THORN/FERGUSON		
3V35-42	RC342	650p
3V31-32	RC344	750p
3V57-58	RC628	750p
TX10 TEXT	RC732	575p
TX10 STEREO TEXT	RC738	575p
TC9-90-100	RC740	675p
3V55, FV11	RC783	750p
TX100 FASTTEXT	RC789	650p
TX100 ST, FASTTEXT	RC789	650p
PROFESSIONAL	RC790	650p
TOSHIBA		
CT937	RC950	750p
CT9117	RC951	750p

WE STOCK REMOTE CONTROLS FOR OVER 5,000 DIFFERENT MODELS
RING FOR MODELS NOT LISTED ABOVE ON 0181 900 2329

8 way Preprogrammed Universal Remote Control

A single remote control to operate Televisions, Videos and Satellite Receivers. Plus Auxiliary Options!

- Replaces up to 8 remotes with one • Simple 4 digit setup routine
- Controls 1000s of models • Teletext functions with Fastext
- Clear (large key) layout • Code Search Facility
- Stylish and easy to operate • Replace broken or lost remotes
- Original remote not required

Order Code: 8 WAY **PRICE: 14.50p + VAT**

2 way Preprogrammed Universal Remote

- Replaces up to 2 remotes (TV/Satellite)
- Simple key arrangement
- Set-up by library review

Order Code: 2 WAY **PRICE: 925p**

REPLACEMENT LINE OUTPUT TRANSFORMERS

Part No.	Code	Price
AKAI		
45150344	LOT56	1650p
101-214017-03	LOT278	1600p
101-220005-03A	LOT72	1600p
D 050/37	LOT27	1450p
D 053/37	LOT207	1550p
D 056/37	LOT56	1650p
D 059/37	LOT200	1600p
D 069/37	LOT56	1650p
FCM 2015 AL	LOT78	1500p
FERGUSON		
00 D-3-508-001	LOT38	1650p
00 D-3-508-002	LOT38	1650p
00 D-3-508-003	LOT276	1550p
00 D-3-515-001 PL1	LOT276	1550p
00 D-4-208-001	LOT79	1800p
00 D-4-208-002	LOT79	1800p
00 D-4-235-002	LOT240	1250p
00 D-4-235-002 HTI	LOT81	1600p
00 D-4-235-00201G	LOT81	1600p
00 D-4-260-004 HTI	LOT38	1650p
00 H-0-701-2400	LOT182	1850p
06 D-3-083-001	LOT82	1400p
06 D-3-083-002	LOT82	1400p
06 D-3-084-001	LOT23	1400p
06 D-3-087-001	LOT23	1400p
06 D-3-088-001	LOT84	1450p
06 D-3-093-001	LOT204	1600p
06 D-3-095-001	LOT87	1450p
06 D-3-095-002	LOT87	1450p
06 D-333-512-001	LOT204	1600p
FETX 100 90 DEG	LOT04	1500p
FETX 90 WHITE	LOT06	1650p
FETX 100 100 DEG	LOT34	1500p
GRUNDIG		
29201.008.01	LOT153	1750p
29201.014.01	LOT140	1850p
29201.015.01	LOT149	1400p
29201.017.01	LOT60	1250p
29201.018.01	LOT163	1300p
29201.018.02	LOT61	1700p
29201.019.01	LOT62	1250p
29201.019.02	LOT62	1250p
29201.022.01	LOT63	1700p
29201.022.02	LOT166	1800p
29201.022.03	LOT165	1750p
29201.022.04	LOT165	1750p
29201.022.04A	LOT165	1750p
29201.024.01	LOT85	1700p
29201.024.04	LOT164	1800p
HINARI		
154 138 K	LOT24	1500p
51 13914 1	LOT24	1500p
51 14184 1	LOT24	1500p
CF 44 A	LOT24	1500p
HM51-1411834-1	LOT24	1500p
HITACHI		
2424593	LOt44	1250p
2432101	LOT79	1800p
2432461	LOT169	1500p
2432611	LOT80	1800p
2432651	LOT80	1800p
2432761	LOT169	1500p
2432981	LOT37	1300p
2432981	LOT37	1300p
2432982	LOT37	1300p
2433011	LOT171	1650p
2433012	LOT171	1650p
2433014	LOT171	1650p
2433212	LOT168	1500p
2433291	LOT172	1700p
2433301	LOT246	1600p
2433441	LOT188	1900p
2433442	LOT191	1600p
2433451	LOT81	1600p
2433452	LOT82	1400p
2433453	LOT82	1400p
2433455	LOT234	1600p
2433521	LOT85	1600p
2433581	LOT22	1500p
2433721	LOT83	1600p
2433751	LOT01	1500p
2433752	LOT01	1500p
2433752	LOT250	1600p
2433891	LOT23	1400p
2433892	LOT84	1450p
2433893	LOT23	1400p
2433952	LOT33	1200p
2434002	LOT200	1600p
2434141	LOT33	1200p
2434274	LOT44	1250p
2434453	LOT86	1600p
2434455	LOT234	1600p
2434593	LOT44	1250p
2435062	LOT296	1600p
2435121	LOT87	1450p
2435131	LOT251	1600p
2435141	LOT282	1450p
2435301	LOT88	1450p
2435671	LOT89	1600p
2436201	LOT109	1450p
2436202	LOT109	1450p
2432101-2	LOT79	1800p
2433451H	LOT81	1600p
2433453H	LOT82	1400p
2433891H	LOT23	1400p
2433892G	LOT84	1450p
I.T.T.		
4515 01 08	LOT113	1400p
4515 01 15	LOT136	1600p
4515 01 16	LOT139	1675p
4515 01 17	LOT139	1675p
4515 01 19	LOT169	1500p
4515 01 24	LOT137	1600p
4515 01 46	LOT136	1600p
4515 03 01	LOT169	1500p
4515 03 02	LOT180	1550p
4515 03 04	LOT169	1500p
4515 03 05	LOT180	1550p
4515 03 06	LOT168	1550p
4515 03 08	LOT22	1500p
4515 03 09	LOT178	1500p
4515 03 10	LOT168	1550p
4515 03 13	LOT30	1500p
4515 03 14	LOT174	1700p
4515 03 15	LOT22	1500p
4515 03 18	LOT192	1550p
4515 03 19	LOT30	1500p
4515 03 20	LOT190	1650p
4515 03 22	LOT196	1550p
4515 03 24	LOT194	1550p
4515 03 25	LOT22	1500p
4515 03 26	LOT198	1550p
4515 03 28	LOT27	1450p
4515 03 29	LOT193	1550p
4515 03 30	LOT179	1550p
4515 03 31	LOT207	1550p
4515 03 34	LOT56	1650p
4515 03 35	LOT193	1550p
4515 03 38	LOT27	1450p
4515 03 40	LOT200	1600p
4515 03 41	LOT56	1650p
4515 03 43	LOT196	1550p
4515 03 44	LOT56	1650p
4515 03 46	LOT201	1550p
4515 03 50	LOT27	1450p
4515 03 51	LOT27	1450p
4515 03 75	LOT56	1650p
4516 16 01	LOT22	1500p
MITSUBISHI		
731003	LOT51	1650p
276-16399	LOT49	1800p
334 B 07803	LOT50	1700p
334 B 078030	LOT50	1700p
334 B 08104	LOT74	1600p
334 B 08108	LOT295	1600p
334 P 18506	LOT51	1650p
334 P 18507	LOT75	1600p
5908-05008A-AA	LOT70	1500p
D 108/37	LOT49	1800p
DCF1577	LOT273	1700p
DCF2077A	LOT272	1550p
KFS 60226B	LOT279	1550p
MSH-1FBW08	LOT78	1500p
NIKKAI		
BABY10	LOT67	1450p
ORION		
3714002	LOT02	1500p
PANASONIC		
TLF 14512 F	LOT39	1850p
TLF 14520 F	LOT40	1500p
TLF 14521 F	LOT39	1850p
TLF 14567 F	LOT39	1850p
TLF 14568 F	LOT40	1500p
TLF 14584 F	LOT41	2000p
TLF 14586 F	LOT42	1800p
TLF 15606 F	LOT256	2500p
TLF 70012	LOT78	1500p
TLF 70012 F	LOT78	1500p
TLF 70012A	LOT78	1500p
TLF 70018	LOT274	1550p
TLF 70018 F	LOT274	1550p
TLF 70161	LOT278	1550p
TLF 70162	LOT72	1600p
TLF 70162A	LOT72	1600p
TLF 70162B	LOT72	1600p
TLF 70162G	LOT72	1600p
TLF 77001 B	LOT274	1550p
PHILIPS		
4822 140 10142	LOT142	1800p
4822 140 101145	LOT134	1450p
4822 140 10146	LOT112	1700p
4822 140 10151	LOT102	2150p
4822 140 10161	LOT103	1250p
4822 140 10171	LOT104	2150p
4822 140 10176	LOT114	1150p
4822 140 10194	LOT105	1750p
4822 140 10198	LOT116	1750p
4822 140 10201	LOT104	2150p
4822 140 10236	LOT118	1750p
4822 140 10246	LOT111	1750p
4822 140 10247	LOT105	1750p
4822 140 10254	LOT107	1600p
4822 140 10263	LOT117	1750p
4822 140 10269	LOT210	1650p
4822 140 10271	LOT208	1650p
4822 140 10274	LOT123	1600p
4822 140 10282	LOT122	1600p
4822 140 10283	LOT104	1450p
4822 140 10294	LOT125	2150p
4822 140 10306	LOT110	1600p
4822 140 10325	LOT132	1300p
4822 140 10326	LOT122	1850p
4822 140 10328	LOT124	1450p
4822 140 10349	LOT106	1450p
4822 140 10353	LOT284	1450p
4822 140 10356	LOT284	1400p
4822 140 10367	LOT286	1400p
4822 140 10369	LOT109	1450p
4822 140 10381	LOT128	1450p
4822 140 10384	LOT127	2150p
4822 140 10395	LOT116	1750p
4822 140 10406	LOT73	1500p
4822 140 10421	LOT109	1450p
4822 140 17078	LOT103	1250p
SANYO		
094-00020/0.9	LOT113	1400p
094-00035/0.2	LOT162	1350p
094-01020/0.7	LOT59	1750p
094-01021/0.6	LOT59	1750p
094-01027/0.0	LOT186	1825p
094-01038/0.7	LOT245	1900p
094-01052/0.8	LOT186	1825p
094-01057/1.1	LOT285	1450p
610.018.6620	LOT189	1650p
610.018.6637	LOT215	1800p
SHARP		
RTRNF 1220 CEZZ	LOT39	1850p
RTRNF 1783 BMZZ	LOT202	1800p
RTRNF 1783 CEZZ	LOT202	1800p
RTRNF 1786 BMZZ	LOT211	1850p
RTRNF 1786 CEZZ	LOT211	1850p
RTRNF 2000 BMZZ	LOT214	1750p
RTRNF 2002 BMZZ	LOT307	1450p
RTRNF 2002 CEZZ	LOT307	1450p
RTRNF 2003 BMZZ	LOT308	1425p
RTRNF 2004 BMZZ	LOT307	1450p
RTRNF 2005 BMZZ	LOT308	1425p
RTRNF 2006 BMZZ	LOT308	1425p
RTRNF 2007 BMZZ	LOT307	1450p
RTRNF 2023 BMZZ	LOT310	1500p
SONY		
3753100	LOT275	1700p
1-439-243-00	LOT91	1700p
1-439-243-11	LOT91	1700p
1-439-243-12	LOT91	1700p
1-439-243-31	LOT229	1700p
1-439-243-32	LOT229	1700p
1-439-243-41	LOT229	1700p
1-439-244-00	LOT48	1800p
1-439-244-11	LOT48	1800p
1-439-244-21	LOT48	1800p
1-439-244-31	LOT48	1800p
1-439-256-00	LOT45	1800p
1-439-256-11	LOT45	1800p
1-439--256-21	LOT45	1800p
1-439-256-22	LOT45	1800p
1-439-276-21	LOT230	1700p
1-439-280-00	LOT92	1700p
1-439-280-13	LOT92	1700p
1-439-286-00	LOT46	1800p
1-439-286-11	LOT46	1800p
1-439-286-12	LOT46	1800p
1-439-286-13	LOT46	1800p
1-439-286-21	LOT46	1800p
1-439-288-00	LOT228	1750p
1-439-288-12	LOT228	1750p
1-439-289-00	LOT47	1800p
1-439-289-21	LOT47	1800p
1-439-289-22	LOT47	1800p
1-439-289-31	LOT47	1800p
1-439-294-00	LOT93	1550p
1-439-294-11	LOT93	1550p
1-439-294-21	LOT269	1550p
1-439-303-00	LOT94	1700p
1-439-303-11	LOT94	1700p
1-439-303-31	LOT94	1700p
1-439-303-32	LOT94	1700p
1-439-311-00	LOT95	1550p
1-439-311-11	LOT95	1550p
1-439-311-13	LOT95	1550p
1-439-311-31	LOT95	1550p
1-439-311-32	LOT95	1550p
1-439-331-22	LOT96	1550p
1-439-331-41	LOT98	1550p
1-439-332-00	LOT99	1700p
1-439-332-11	LOT9	1700p
1-439-332-21	LOT99	1700p
1-439-332-41	LOT100	1700p
1-439-332-42	LOT101	1700p
1-439-332-52	LOT100	1700p
1-439-333-00	LOT270	1550p
1-439-333-11	LOT270	1550p
1-439-333-12	LOT270	1550p
1-439-363-11	LOT268	1550p
1-439-363-21	LOT268	1550p
1-439-387-11	LOT311	1600p
1-439-387-21	LOT311	1600p
1-439-416-11	LOT255	1750p
1-439-416-12	LOT255	1750p
1-439-416-21	LOT255	1750p
1-439-416-23	LOT255	1750p
1-439-416-41	LOT255	1750p
1-439-416-51	LOT255	1750p
1-439-430-21	LOT271	1550p
154125A	LOT275	1700p
TOSHIBA		
37010	LOT131	1450p
37011	LOT131	1450p
37012	LOT131	1450p
37013	LOT131	1450p
37014	LOT131	1450p
37015	LOT131	1450p
37016	LOT131	1450p
37017	LOT131	1450p
37018	LOT131	1450p
37019	LOT131	1450p
1810951	LOT55	1700p
2433751	LOT01	1500p
2433752	LOT250	1600p
23236023	LOT281	1550p
23236052	LOT131	1450p
23236098	LOT288	1400p
23236198	LOT288	1400p
23236255	LOT289	1500p
23236424	LOT129	1500p
23236425	LOT288	1400p
23236428	LOT289	1500p
3122113837011	LOT131	1450p
150F6D	LOT131	1450p
TFB 4039 AD	LOT293	1550p
TFB 4048 AD	LOT281	1550p
TFB 4048 BD	LOT281	1550p

NIKKAI BABY 10 REGULATOR

ORDER CODE : BABY10
PRICE : £12.00

UNIVERSAL TRIPLER PRICE: £5.00 EACH

PLEASE PHONE US FOR ANY TRANSFORMERS NOT LISTED , AS THIS IS JUST A SELECTION OF THE PARTS THAT WE STOCK

LINE OUTPUT TRANSFORMERS SPECIAL OFFERS!!!
(Valid 15/8/97 to 14/9/976)

Make & Part No	Code	Normal Price	Special Offer Price
Hitachi 2433751, 2433752	LOT01	1500p	1250p
Orion 3714002	LOT02	1500p	1250p
Ferguson Blue Spot 00 D-427002	LOT04	1500p	1250p
Ferguson White Spot 00 D-427001	LOT06	1650p	1400p
Sony 1-439-332-41, 1-439-332-52	LOT100	1700p	1500p
Sony 1-439-332-42	LOT101	1700p	1400p
Ferguson Green Spot 06 D-3-084-001, 06 D-3-087-001	LOT23	1400p	1200p
Hitachi 2433952, 2434141	LOT33	1200p	1000p
Panasonic TLF 14584 F	LOT02	1500p	1250p
Hitachi 242593, 2434274, 2434593	LOT44	1250p	1000p
Amstrad TVR3, TVR4 1810951	LOT55	1700p	1400p
Philips AT 2079/10A	LOT57	1350p	1100p
Ferguson 06-D-3-070-001	LOT64	500p	375p
Ferguson 06 D-3-095-001, 06 D-3-095-002	LOT87	1450p	1000p

GRANDATA LIMITED
K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX, ENGLAND. HA9 0HB
Telephone: 0181 900 2329 Fax: 0181 903 6126 E-Mail: grandata.ltd@btinternet.com
OPEN Monday to Friday 09:00 - 17:30 Saturday 09:00 - 14:00

HELP WANTED

The help wanted column is intended to assist readers who require a part, circuit etc. that's not generally available. Requests are published at the discretion of the editor. Send them to the editorial department – do not write to or phone the advertisement department about this feature.

Wanted: Circuit diagram/maintenance information for the Tandon Model TM4142 laptop computer. Ted Francis, 22 Glebe Drive, Rayleigh, Essex SS6 9HJ. 01268 780 029.

Wanted: Lead or D-plug pin connections for a cable link between a Philips ETS100 word processor and a Brother CE60 typewriter. F. Anderson, 25 Ewe Hill Terrace, Fencehouses, Houghton-le-Spring, Tyne and Wear DH4 6JX. 0191 385 4057.

Wanted: A 'Sprinter' processor chip unit for increasing the speed of my Amstrad PCW8512 word processor. Donald Bullock, Buzon 226, Ambolo 2, Costa Nova, Javea, Alicente, Spain. 00 346 647 1357 (from UK).

Wanted: Original remote control unit for the Hinari VXL8 VCR, or information on a possible source. Vines Parmar, 9 The Sheddings, Great Lever, Bolton, Lancs BL3 2JN. 01204 527 682.

Wanted/for disposal: Require circuit/manual for the Philips PM5506 pattern generator. Have for disposal 405-line TVs, valves, tubes etc. D.P. Bunker, 326 High Street, Berkhamstead, Herts HP4 1HT. 01442 864 334 (evenings).

Wanted: TV IF/demodulator PCB for the Panasonic NVG7 VCR; customer control cover for the Ferguson 3V43 VCR; line driver transformer (T801) for the Sony KV2752; take-up reel sensor unit for the Ferguson 3V59 VCR. Les Mawdsley, One-Way TV, 82 Sandhurst Road, Rainhill, Merseyside L35 8NQ. 0151 426 4152.

Wanted: Tube base with associated transistors and drive potentiometers for the Hitachi Model CPT1471 (NP82C-2 chassis). Roger C. Cleal, 2 Smythe Grove, Warwick CV34 5SE. 01926 498 868.

For disposal: Philips colour TV pattern generator. Price new £3-4,000. Will accept any reasonable offer. Clare comprehensive test station. Ramesh Lad, 16 Gurney Close, Bradford BD5 9QR. 01274 693 331.

Wanted: LOPT for the Matsui MB10 colour portable. Type no. is FCA030, and the word Sampo is present (manufacturer?). Or advice on a possible alternative. Ian Nurse, 43 Otmoor Way, Heyside, Royton, Oldham OL2 6SD. 01706 882 081.

Wanted: Video heads for the Philips Model VR2324 VCR (V2000 system). Part no. is 4822 691 20195. Also bridge, part no. 4822 691 20168. T. Hughes, 41 Underhill, Moulsford, Nr. Wallingford, Oxon OX10 9JH. 01491 651 576 (evenings/weekends).

Wanted: Data sheets with pin connections for the following ICs: Dallas DS80C320 microcontroller; 27C256 EPROM; 74HC573 logic chip. Does anyone know of a stockist of the DS80C320 or a supplier of 0·8mm thick photoresistive PCB (has to be thin enough to fit a smart card socket? Also circuit diagram or schematic (photocopy OK) for the Two View Smart Card doubler, to assist repair of a damaged unit. William Moore, Meadow View, WhiteHouse Farm, Cabourne, Lincs LN7 6HU. 01472 852 436 (evenings).

Wanted: Azimuth test tapes for 7in. open-reel tape recorders, speeds 3·75 and 7·5 in./sec. They should be for head alignment and speed tests. L.H. Singleton, Upstairs Flat, 87a Bryngwyn Road, Llanelli SA14 8LH. 01554 741 562.

Wanted: Three-button ultrasonic handsets for the Ferguson TX9 chassis. A. Acheson, 48 Wessex Road, Horndean, Hants PO8 0HS. 01705 599 200.

Wanted: Pinch roller for the Wollensak cassette deck, Model 4766. Call Mark on 01764 664 813.

Wanted: Service/workshop manual and operator's manual for the Philips VHS camcorder type VKR6800/00, NR H5H 6001127, VQL2882. Photocopies OK. Thomas Lutton, Foymore Dungannon Road, Portadown, Co. Armagh, N. Ireland BT62 1QA.

Wanted: AC adaptor for the Panasonic NV100B VCR or details of the adaptor multipin connector. Also a NAB adaptor for a reel-to-reel tape machine. Rob Hannah, 21 Kilmaurs Road, Knockentiber, Kilmarnock, Ayrshire KA2 0DA. 01563 531 559.

Wanted: Chopper transformer for the Finlux 1000 chassis (Model 1412). J. Wallis, 907 Old Kent Road, London SE15 1NL. 0171 639 9903.

Wanted: Following back issues of *Television*: January, February, April, June, August, September and October 1988; November and December 1989; January, March, April and August 1990; November 1991. Brian Downs, Media Services Dept., University of Glasgow, 64 Southpark Avenue, Hillhead, Glasgow G12 8LB. 0141 330 3739/4993.

Wanted: LM8854-1912 syscon chip or a syscon/servo PCB for the Fisher FHV-P906 VCR – or information on a supply source. L Costello, 3 Rowan Grove, Liverpool L36 5XU. 0151 489 3586.

Wanted: Operating instructions for the Sharp VCA5011 VCR, especially the index search part. Photocopy fine. Ray Palmer, 5 Hawkley Close, Leigh Park, Havant, Hants PO9 5EL. 01705 451 544.

Wanted: Remote control handset for the Salora XLE8901 satellite receiver. C. Rodwell, 42 Gosbeck Road, Helmingham, Stowmarket, Suffolk IP14 6ET. 01473 890 746.

Wanted: Vision and sound valve IF PCB for the dual-standard GEC/Sobell Models 2010/1010 or 2014/1014, dating from the mid Sixties. D. Longstaff, 100 Hawthorne Avenue, Anlaby Road, Hull, E. Yorks HU3 5QR. 01482 509 898 (evenings).

Wanted: Colour decoder/RGB panel for the Mitsubishi Model CT2555STX or CT2155STX. P. George, 113 Farebrother Street, Grimsby, N.E. Lincs DN32 0JT. 01472 354 665.

Wanted: £1 coin inserts or someone to modify 50p inserts to take £1 coins, for Smiths Switchmaster 4000 series TV meters (grey) or Coinmechs TV timer Mk. II (black). E. Longton, 47-49 Back Victoria Street, Fleetwood, Lancs FY7 6EJ. 01253 778 338.

Wanted: Circuit diagram/service manual for the EMI 101 oscilloscope. Photocopies or loan OK. David Irvine, Mealoughmore, Windgap, Co. Kilkenny, Ireland. 00 353 51 648 376.

Wanted: Service manual or circuit diagram for the Mitac NB6600C laptop computer. Geoff Davies (Radio), 13 Bowen Road, Rugby CV22 5LF. 01788 574 774.

Wanted: Combi choke part no. 525-462 for the Ferguson Model 3787/NordMende Model 8180. Circuit breference no. is VA01. Michael Dranfield, 6 Calesdale Close, Buxton, Derbyshire SK17 9RH. 0129 873 492 (evenings), 0129 871 689 (daytime).

Servicing the Salora M Chassis

Chris Watton deals with the digital processing sections of the receiver followed by fault finding and setting up

Last month we dealt with the power supply and timebase circuitry used in the Salora M chassis. A 40-pin microcontroller chip, ICB1, has overall charge of the operation of the chassis. It's responsible for driving the display, decoding the remote control commands, key scanning and the frequency synthesis tuning system. The type number varies with model. Two other chips work with ICB1, the X2404 memory chip ICB50 and an MEA2901 tuner interface chip ICB61. The latter selects the band and provides the tuning voltage, on information it receives from the microcontroller chip.

ICB1 must be powered and running in the standby mode. It receives the standby 5V supply at pin 27 while its clock oscillator is controlled by the 4MHz crystal XTB1 which is connected to pin 1. Pin 4 is the reset pin.

Tuner/IF Module

The tuner/IF module TU101 contains the tuners, the complete IF circuit with AFC, and video amplifiers for the scart 1 input. Important pins are as follows:

Pin 1 chassis.
Pin 2 tuner AGC input (from pin 16).
Pin 3 12V input.
Pin 7 UHF select.
Pin 8 0-30V tuning input.
Pin 9 5V A input.
Pin 11 prescaler output (÷64)
Pin 12 chassis.
Pin 16 AGC output to pin 2.
Pin 20 sound IF output
Pin 24 demodulated video output.

The AGC voltage at pins 2 and 16 is about 2V with no signal and up to 7V with a strong signal. We'll look at the sound and video channels next – the block diagram in last month's article (Fig. 1, page 717) shows the overall arrangement.

Sound Channel

The sound output from the tuner/IF module, whether the set is stereo or mono, goes to pin 13 of the Nicam/audio module (socket Q5). Demodulated outputs appear at pins 4 and 5. These go to pins 4 and 5 of the ADC2301E analogue-to-digital converter chip ICB101, which also receives L and R scart inputs at pins 21 and 24. After conversion to digital form, the sound signals exit this chip at pins 10 and 11. ICB101 has 5V inputs at pins 12 and 20 and a 12V input at pin 13.

The digital audio signals are passed to pins 16 and 17 of the APU2470S/APU2471S audio processor chip ICB102. This chip is responsible for input selection; volume, bass, treble and balance adjustment; and headphone volume and balance adjustment. It can generate a simulated stereo (wide sound) output for the speaker channels. These functions are all controlled via the IM bus. The outputs, which consist of pulse-width modulation, appear at pins 19 (phones left), 20 (phones right), 22 (speaker left) and 23 (speaker right). ICB102 receives a 5V supply at pins 7, 14 and 18, also a reset pulse at pin 11.

The audio signals now pass to the filter and headphone amplifier module (at pins 10 and 11 for headphones, pins 12 and 13 for the speaker inputs). The headphone outputs from this module are taken to sockets at the front of the set. The speaker outputs, at pins 4 (left) and 5 (right), are passed to two TDA2040 audio output chips, ICB130 and ICB140 respectively. There are three supplies to the filter and headphone amplifier module, –4·5V at pin 3, 17V at pin 7 and 12V at pin 8. The TDA2040 audio output chips receive their inputs at pin 2, provide outputs at pin 4 and receive +15V and –15V supplies at pins 5 and 3 respectively.

The Video Channel

The video signal at pin 24 of the tuner/IF module is fed to pin 35 of the VCU2133 video codec chip ICB201, at an amplitude of about 2V peak-to-peak. This may be either the demodulated off-air signal or the scart 1 video input signal. The scart 2 video input signal goes via emitter-follower TB201 to pin 37 of ICB201, at a lower level – 1V peak-to-peak. We'll consider the former signal.

After amplification and blanking, ICB201 converts this to seven lines of digital video data. These outputs appear at pins 2-8. Pin 36 receives a line blanking pulse, pin 39 combined line and field pulses. These should be checked in the event of a blank screen, because a field output fault will for example upset the blanking and shut off the digital outputs, cutting off the tube. The amplitude of the digital outputs is about 1V peak-to-peak, and they all look the same when checked with an oscilloscope. I find that a test picture from a VCR, consisting of one white stripe on a blank raster, is useful in showing the digital signals clearly. ICB201 should have a 17·7MHz clock signal at pin 22 and a reset pulse should

appear at pin 23. This pin also receives hold pulses from ICB240, see later. ICB201's supplies are 12V at pin 38 and 5V at pins 1, 9 and 25.

The digital video outputs from ICB201 enter the VPU2203 video processor chip ICB230 at pins 5-11. This IC separates the luminance and chrominance signals, adjusts the contrast, decodes the chroma signal, sets the saturation level, checks the beam current and measures the gain and cut-off levels for tube drive.

Luminance data outputs appear at pins 32-39, chroma signal outputs at pins 27-30. The 17·7MHz clock signal should be present at pin 22 and a reset pulse should appear at pin 20. A 5V supply is fed to pins 12, 24 and 31.

The digital video outputs from ICB201 are also fed to the TPU2734 teletext processor chip ICB250 and the DPU2543 deflection processor chip ICB501. ICB250 operates in conjunction with a 4164 RAM chip ICB260. Its jobs are to extract text information from the digital video signal, control its associated memory chip, and provide a loop-through for external RGB inputs. It's controlled by the IM bus, receives the 17·7MHz clock signal at pin 36, a reset pulse at pin 13, line pulses at pin 11 and combined field and line pulses at pin 12. The RGB outputs are at pins 6, 7 and 8 respectively, with a fast blanking output at pin 9. These outputs are returned to ICB201 for further processing. There's a 5V supply at pins 26 and 35.

The DPU2543 deflection processor chip ICB501 extracts the sync information from the digital video inputs. It also provides clamping voltages for the video signals in ICB201. Pins 8, 32, 35 and 40 receive a 5V supply. Clock pulses are fed to pin 2; pin 5 is for reset.

The digital luminance and chroma outputs from the video processor chip ICB230 go to the DTI2223 digital transient improvement chip ICB240. As the transmitted luminance signal has a bandwidth of 4MHz while the associated chroma signal has a bandwidth of only 1MHz, colour transients would occupy a wider portion of the screen than luminance transients unless steps were taken to correct this. ICB240 processes the digital chroma signal to provide rise and fall times that are the same as those of the luminance signal. It also generates hold pulses which stop the colour-difference signal DA converters in ICB201 during colour transients to provide coincidence with the luminance signal, adjusts the colour level, delays the luminance transients, and adjusts the chroma and luminance signal delay times.

The chroma outputs from ICB240 appear at pins 22-25. The luminance outputs are at pins 27-34. Pin 21 is the output for the hold pulses. ICB240 receives 17·7MHz clock pulses at pin 2, a reset pulse at pin 37, line pulses at pin 38 and combined line and field pulses at pin 39, with control via the IM bus. A 12V supply is fed to pin 26, with 5V fed to pins 1 and 14.

The luminance and chroma outputs return to the VCU chip IC201, luminance at pins 10-17 and chroma at pins 18-21, for DA conversion and matrixing. Analogue RGB outputs appear at pins 28, 27 and 26 respectively.

Picture in Picture

Some sets incorporate a picture-in-picture option, which is inserted between the digital Y/C outputs from ICB240 and the inputs to ICB201. It's mounted on a subpanel and can provide a small picture in the corner of the main picture. The input can be selected from either scart socket (1 for a satellite receiver, 2 for a VCR) so that the viewer can watch the terrestrial channel with a satellite or VCR picture insert.

Once the required input has been selected it's AD converted then passed to additional VPU and DPU chips. These work in much the same way as the chips on the main PCB. Six lines of digital luminance signal and four lines of digital chroma are then taken to the PIP2250 PIP processor chip ICOM401, which takes 672 samples from 216 lines of the selected picture. After processing and compression, the digital information is stored in two 4416 16K x 4bit RAMs, from which it can be retrieved for display at the request of the user.

The PIP is a still-picture display which can be inserted at any of the four corners of the screen. The digital data for it is sent to ICB201 along with the data for the main picture.

Fault Finding

Rather than having a fault in the digital circuitry, the sets that come our way mainly suffer from the dead-set symptom. As suggested last month under the heading "No Go", to determine the section of the set at fault in this situation, force it into the standby mode. If the set will work in standby, the primary side of the power supply is probably OK and the cause of the trouble is likely to be in the line timebase.

A burn up in the line output stage is not uncommon, because the capacitors tend to become dry-jointed. As a result the line scan current makes a hole in the board. In this situation the S2000AF/2SD1577 line output transistor will probably have failed. We used to repair the print and fit a new transistor, but quite often the transistor would fail again. So we now replace a number of components, which seems to increase the set's reliability.

The items we replace are as follows: TB521 (BC237B), TB522 (BC307B), TB523 (BC368), TB524 (BC369), TB525 (S2000AF), CB622 (470µF), CB623 and CB624 (both 220µF). We uprate these three capacitors to 35V, 105°C. Before going further we resolder the Ipsalo transformer MB601 and the LF0070 chopper drive chip HB701, also capacitors CB525, CB526, CB527, CB528 (90° sets) and CB531. CB622/3/4 are often faulty. Any line output stage capacitor that has had a burn up at one of its connections should be replaced. All this might seem to be a bit extravagant, but the cost of these items comes to only a few pounds. If you end up with about half a dozen S2000s that are as much use as bits of wire you will wish that you had taken these preventive measures.

It is common to find that the BS208 FET EW modulator driver transistor TB526 has failed. This is often because of dry-joints at CB527, CB528 (90° sets), CB531, DB523 (BY448), DB524, DB525 (both BYV95C) and RB538 (10kΩ). In the M2 version of the chassis there are two BS208 FETs. The FET can be the cause of a few faults. Width faults, such as poor EW correction or no width adjustment, will be present if it is leaky. RB542 (18kΩ – 27kΩ in the M2 version) should also be replaced as it often fails, sometimes intermittently, causing width variations.

Back to the power supply section. If the set will come on in standby but the ±15V (typically ±11-13V) supplies are low/missing, CB617 (6·8µF) is open-circuit. If the base of the line output transistor TB525 is at 0·6V when the set is in standby, check this voltage when you switch to on. If the voltage remains at 0·6V, TB521 (BC237B) is probably leaky.

A squawk from the power section at switch on/off with a line tear on bright pictures can be caused by diode DB524 (BYV95C) or the LF0070 chopper drive chip HB701.

A bright, 2in. wide scan can be caused by TB526 (BS208) or RB542 (18kΩ or 27kΩ, see previous note).

OPTIONS CHART

Option 1

Bit 0	Bit 1	Make	Bit 2	8 mins sleep	Bit 3	AES control
0	0	Salora	0	Yes	0	Off
1	0	Granada	1	No	1	On
0	1	Luxor				
1	1	Other				

Bit 4	Bit 5	Tuner	Bit 6	Bit 7	IF (MHz)
0	0	Ch. 00-120	0	0	38·9
1	0	4-band + hyper	1	0	39·5
0	1	UHF chs. 21-69	0	1	38·0
1	1	3-band	1	1	37·0

Option 2

Bit 0 is used for mute when no sync signal is present. 0 = yes, 1 = no.

Bit 1 is used for remote control decoding. 0 = double check, 1 = normal.

Bit 2 is used for PAL/Secam identification. 0 = only in P mode (indicated by dot at top left in the display), 1 = always on.

Bit 3 is used for AFC tracking. 0 = no (VCR operation), 1 = AFC tracking with programme numbers 7 and 8.

Bit 4 is used for tuning protection. 0 = no protected programmes, 1 = programmes 1-6 are protected (need password to store).

Bit 5 is used for bleep control. 0 = text bleep on (normal), 1 = bleep for production computer.

Bit 6 is used for OSD bargraph control. 0 = bargraph only, 1 = bargraph with text.

Bit 7 is used for OSD (on-screen display) control. 0 = no, 1 = yes.

Option 3

Bit 0	DTI	Bit 1	NTSC	Bit 2	FM radio	Bit 3	S Video
0	No	0	No	0	No	0	No
1	Yes	1	Yes	1	Yes	1	Yes*

Bit 4 is not used.

Bit 5 is used for PIP change with programme keys. 0 = no, 1 = yes.

Bit 6 is not used.

Bit 7 is used for search of FLOFF start page. 0 = yes, 1 = no (selected page is retained during programme changes).

*VCY2136 and VPU2204 only.

A blank raster with no channel display can be mistaken for a power supply fault but is more often caused by a defective X2404 memory chip (ICB50). This is supplied as an empty memory, but will initialise itself if the set is switched on with the normal key depressed and this key is held for a short time.

A low buzz on the sound with probably a poor picture can be caused by HB701 (LF0070). If so the HT voltage will be low (it should be 150V at CB614). Replace HB701 if the HT voltage is low.

The most common cause of the no picture, sound OK symptom is the TDA8172 field output chip ICB570. To check, advance the setting of the first anode (G2) control: if there is illumination at the top of the screen, the TDA8172 chip is duff; if a raster appears, the cause of the fault lies elsewhere. In this event, check for the presence of an analogue video signal at pin 35 of the VCU chip ICB201. If there is no video here, go back to the tuner/IF module. If video is present, check for line/field pulses at pin 39 of ICB201. If the pulses are missing, check TB571 (BC557) which could be leaky.

Setting Up

The set-up procedure for these receivers can be tedious to say the least. Fortunately little adjustment is required. To enter the set-up mode you have to key in a password via the remote control unit, or service processor as it then becomes. The password is P * O # >M, the maximum time allowed between the last two key operations being 1·5secs. This password and time scale are intended to prevent customers entering the service mode accidentally. The password for storing tuning information is P O # >M.

Once the service mode has been entered, the numerical channel display will change to a two-digit number that indicates the microcontroller chip's mask version, typically 04, 07 or 12. The various setting-up stages can then be selected by pressing the # or * button to go forwards or backwards respectively through the procedure. You don't have to follow a set sequence, but the one listed below is the preferred order.

I strongly recommend that you obtain an M chassis service video cassette, which goes through the set-up procedure and provides various tips. A service manual is also essential.

The preferred adjustment order is as follows – the second column shows the segment indication as best we can:

1	XX	Mask indication
2	SP	Phase shift
3	bP	Line shift
4	dL	Luminance delay
5	dC	Chrominance delay
6	Y0	Width
7	r0	Trapezium 1
8	C0	Pincushion 1
9	t1	Summing point 1
10	r1	Trapezium 2
11	C1	Pincushion 2
12	t2	Summing point 2
13	H0	Height
14	A0	Vertical shift
15	ud	Lum/chroma delay
16	Sr	DTI start
17	S7	DTI stop
18	SA	Colour osc sync
19	62	A1/G2 voltage
20	cr	Red cut-off point
21	c6	Green cut-off point

22	cb	Blue cut-off point
23	dr	Red gain
24	d6	Green gain
25	db	Blue gain
26	HA	Text line shift
27	CA	Text contrast
28	One bar	Option byte 1
29	Two bars	Option byte 2
30	Three bars	Option byte 3

Fig. 4: The numerical channel indicator display. When setting the options in the service mode the left-hand digit shows the byte and the right-hand digit the bit (the mute dot is used for bit 0).

Make the vertical adjustments as follows. First adjust the height (H0) until the picture is correct at the top of the screen. Then adjust the vertical shift (A0) for a correct display at the bottom of the picture.

The A1/G2 voltage is set with the brightness and contrast at minimum. Adjust the potentiometer, which is on the tube base panel, so that the mute and prog LEDs are both out. As you turn the potentiometer you will see the LEDs light up and go off. When both are off the voltage is correct.

Adjust the colour oscillator synchronism for a nearly stationary colour display. When adjusting the RGB cut-off points you will notice that one of them is fixed: the mute and prog LEDs will both be on and the setting cannot be altered. So the grey-scale setting up must be done with the other two colours.

It is essential to press the memory button (>M) after each adjustment.

Option Bytes

A set's characteristics are determined by setting up various bits in the microcontroller system. The options are displayed by the numerical channel indicator: the left-hand digit shows the byte, the right-hand digit the bits in the byte (see Fig. 4). When in the service mode you can switch the bits to 0 or 1 by using keys 0 to 7 on the remote control handset. When a segment lights, the bit is set to 1, when it is not alight the bit is set to 0.

The options don't change until the set returns to the normal operating mode, even when a new setting has been stored. If an incorrect mode has been selected and stored, when the set is returned to the normal mode it will still come on but may not, for example, have text or sound or refuse to tune. This can easily be put right by returning to the service mode and revising the information. The various option settings are shown in the accompanying chart.

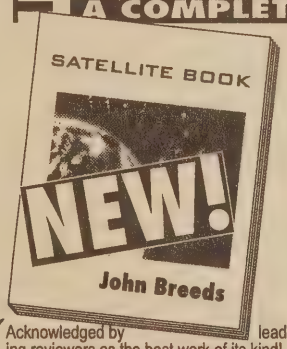
Spares

Spares for Nokia Group TV and video products are now supplied to dealer account holders by Akai UK Ltd. The spares ordering line is 0181 759 2367. CHS (Chas Hyde and Son Ltd.), Prospect House, Barmby Road, Pocklington, Yorks YO4 2DP (01759 303 068, fax 01759 303 620) is the official spares agent.

5TH EDITION COMPLETELY REVISED & UPDATED FOR 1997/98 ISBN: 1 872567 11 8

THE SATELLITE BOOK

A COMPLETE GUIDE TO SATELLITE TV THEORY AND PRACTICE



- ✓ Acknowledged by leading reviewers as the best work of its kind! A marvellous teaching manual used in colleges, company training schools and government institutions!
- ✓ Drawing on John Breeds' extensive experience as an engineer, products manager and lecturer in the international television industry this book provides all essential details and data!
- ✓ Every facet of satellite technology is included in this concise reference!
- ✓ Describes in detail how to set up a fixed dish, polar mount principles, the modified mount, horizon to horizon polar mount.
- ✓ Full details of polar installation for anywhere in the world! World-wide angles given.
- ✓ Written in easy-to-read style, lavishly illustrated with hundreds of line drawings, graphs, tables, charts and photographs, on hundreds of pages, large A4 format!
- ✓ Dish angle settings, polar and apex angles of all main towns across Europe, South Africa and Saudi Arabia, and charting system for world-wide coverage!
- ✓ Includes diagrams and tables of EIRP v dish size, footprints, satellite listings!
- ✓ Clearly describes the forbidden channels to avoid in any distribution system, and how to overcome intermodulation and interference from channel 5 and VCRs!
- ✓ Covers all practical aspects, such as:- ladders, tools, customer care, fixings, types of meters, cables, fault-finding, etc!
- ✓ Describes modern techniques such as DiSEqC switching, Universal LNBs, digital link analysis, latest IF distribution systems, SMATV equipment and conversion techniques, and latest digital TV methods!
- ✓ Includes chapters on marketing opportunities, MPEG 2 techniques, geostationary satellites, microwave technology, ASTRA and EUTELSAT satellite characteristics!
- ✓ There is also a thorough analysis on FM threshold and extension techniques, the VideoCrypt system, antenna design, link budgets, glossary, plus lots more!
- ✓ Unconditionally recommended for professionals, students, engineers, installers and enthusiasts!
- ✓ New edition 5 with more pages, more diagrams, more information, and completely revised and updated!

WORLDWIDE ACCLAIMED BY THOUSANDS!

"... An impressive book ... practical aspects are dealt with in a way that leaves no doubt ... lavish use of very clear diagrams throughout."
Television

"... All in all most of the information you'll ever need or want to know about satellite television is at your fingertips ... It's certainly the best work of its kind".
What Satellite

"John Breeds' most comprehensive work yet ... useful tips for people thinking of setting up their own business ... this is the one to read, even if you haven't got a technical background - the text is well written and very easy to understand".
Which Satellite

"A bible for the satellite TV industry ... includes invaluable hints, tips and tricks of the trade."
Interspace

"It is a first-class product; beautifully produced ... the definitive, comprehensive reference work on satellite TV technology ... much of it in words that even the less technically minded can understand"
ERT

"...a magnificent tome... Chapters cover just about every facet of the subject ... well written ... Thoroughly recommended."
Independent Electrical Retailer

"... the most comprehensive, incisive and informative book ever published on satellite television."
Satellite Trader

SPECIAL OFFER - FREE WITH EVERY ORDER OF 'THE SATELLITE BOOK'

SATELLITE SECRETS REVEALED! Jack Armstrong
At least 50% devoted to fault-finding on specific satellite receivers. Lists of common faults for each model etc, and secret handset codes.

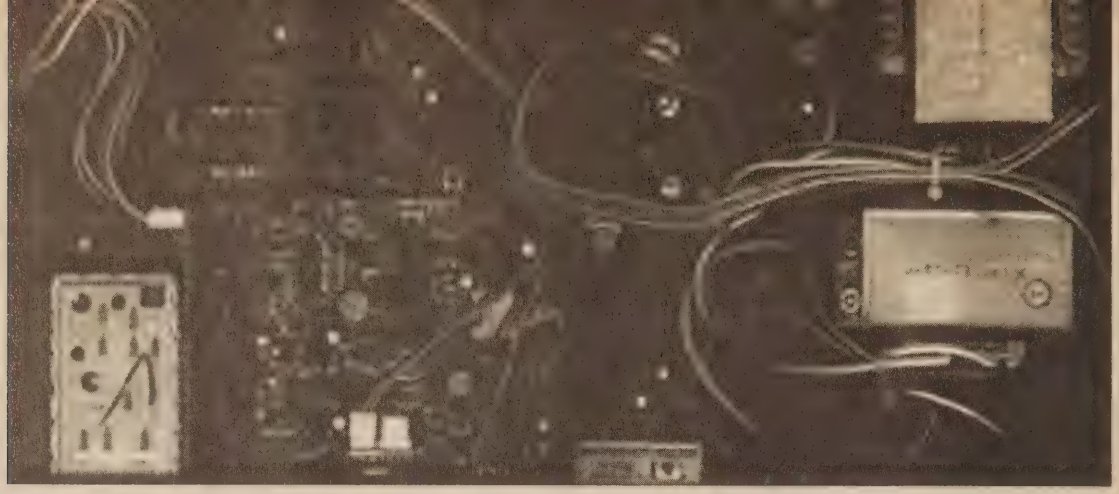
Offer subject to stock availability. You must state you want to take advantage of this offer at the time of ordering 'The Satellite Book' @ £34 ea.

SAE for complete list, or Web site:- http://www.swiftpub.u-net.com/

SWIFT TELEVISION PUBLICATIONS
17 Pittsfield, Cricklade, Wilts, SN6 6AN, England
Tel 44 (0)1793 750620 Fax 44 (0)1793 752399

ONLY £34

POSTAGE:-
UK: £3.50
EUROPE: £5
R of W: £16



Satellite Notebook

Reports from Hugh Cocks Chris Watton and John C. Priest

The Flying Dutchman

Henk the Dutchman arrives here about once a month in a van loaded with all manner of decoders and receivers which he offers for sale. Recently he turned up with four very late production (November 1995) Pace PRD800+ IRDs which had been labelled "returns" by a large UK electrical retailer. They looked as if they had never been used, and had a collection of unusual/silly faults.

The first one produced a blue screen, with no sound, when a signal was applied. Baseband video was coming from the tuner but didn't get very far as one leg of an electrolytic coupling capacitor had never been soldered.

The mains bridge rectifier's reservoir capacitor (C2, 47µF) was open-circuit in the second receiver. This didn't help its operation!

The third receiver refused to power up, which was not surprising as the mains input filter choke T1 wasn't soldered in properly.

The fourth set was the puzzler. Reception via the scart socket was perfect, and I was beginning to believe that my luck was in. But when the UHF output was tried (after adjusting the intercarrier sound frequency – L7 – from 6 to 5·5MHz for use here in Portugal) there was a picture with a mass of faint diagonal lines on it. As this interference wasn't present at the scart outlets, I checked to see whether the modulator's supplies were clean. They were of course. After a lot more checking that got me nowhere I suddenly realised, looking at the bottom of the board, that there was no screening cover beneath the modulator. One was soon in place, taken from a scrap board. All trace of the diagonal lines had then been removed. I've personally never had any reason to remove this cover. It certainly provides an efficient screen. **H.C.**

Satellite Finder

Henk also had in his van a 'digisat' satellite finder. This Swedish-made unit can be connected in line with the LNB's output. It has an LED bar display to indicate the LNB voltage, the current drawn and whether a 22kHz tone is present. Using a push-button to change the readout gives you a display of satellite signal strength. There's also an optional audio tone output. At less than £40 it's an ideal general-purpose tool for the installer and troubleshooter. The circuit, on a small PCB, is based on a 'PIC' 16C71 IC. It's very well made.

A label at the back of the unit indicated that it is made by Emitor AB in Sweden. Unfortunately there's no address. I did see the unit being displayed by a German exhibitor at the recent Cabsat '97 show. If you can find one, it's a worthwhile investment. **H.C.**

Another PRD800+

This early PRD800+ receiver (made in February 1994) came in with the complaint "blue screen, no sound". There was no difference when a signal was connected to the unit, though weak noise was coming from the tuner. Otherwise the receiver's operation seemed to be normal – the front display looked a little dim however. This was hardly surprising as the 5V supply was low at about 3·5V while the 12V supply was at around 9V, with a very nasty-looking dip in the waveform I'd not seen before.

The reservoir capacitors in the 5V and 12V supplies looked tired and were replaced, but this made no difference. I did however notice that the receiver was running marginally cooler than they usually do. The higher voltages from the chopper transformer were more or less correct, and powering the circuitry from external supplies produced pictures. What could be left?

A wire beneath the board goes from the earthy end of the transformer's secondary windings to the main earth print area nearby (later PRD+ receivers I've seen don't have this wire). Although the wire's soldered connections looked OK, I decided to replace the wire and remake the soldering. Bingo! – the receiver then behaved normally.

Flushed with success, I downloaded new channel information from a later type PRD+ receiver. All the frequencies were 250MHz out despite the fact that both units had an FSS A/B 9·75/10GHz LNB changeover in the installation menu. All I can say is do this with care: I reset the frequencies manually, then took a memory dump to the Pace Link. This is now stored as "early 800+", the others being stored as "late 800+". The frequencies don't mix. **H.C.**

Channel 5 via Astra 1D

Channel 5 took over transponder 63 (10·931GHz horizontal) aboard Astra 1D from the old Filmnet E. Europe. It uses so-called 'soft' VideoCrypt encryption, similar to the QVC shopping channel, i.e. no viewing card is required. We subsequently had some requests to be tuned in from people with older systems that don't cover the 1D band and who mostly have VideoCrypt decoding facilities (IRD and non-IRD) but no viewing card.

Apart from supplying a 1D con-

verter, the easiest way to retune is to shift the LNB's local oscillator frequency by one Astra channel. This will take Channel 5 to around 10·960 on the tuning range of an old receiver. Sky Sports 3 will then be at around 11·7GHz (originally 11·671GHz).

How long soft encryption will last is a matter of opinion. At present it means that the channel is freely available across Europe to anyone with a VideoCrypt decoder.

Some receivers, such as the Pace SS9000, tune up to 11·750GHz, giving a 50MHz margin. With Amstrad receivers however there is no leeway: Channel 5 will be right at the bottom of the tuning range and Sky Sports 3 at the top!

To retune the LNB, take off the outer cover (the rivets have to be removed with the old Marconi Blue Cap LNBs) and locate a large screw that goes into the inner cover. It's usually locked with sealant. Turn the screw anti-clockwise, the exact amount depending on the make of LNB.

It is best to be able to see live signals while doing this. Go to say Sky News and turn the screw until 3 Sat appears. The LNB has then been tuned sufficiently. The LNB signal test source I described in the January 1996 issue of *Television* enables this to be done very easily. If it's difficult to see live signals while retuning the LNB, undo the screw by a quarter of a turn. This should be enough, leaving Sky Sports 3 at the top of the band.

Some channel retuning will then be required. This can be the worst bit of the job! Reseal the LNB well to prevent ingress of water, possibly putting some grease on the sealing ring between the two halves of the outer cover. **H.C.**

Pace SS9000/9200 Tuner Replacement

The Hitachi tuner originally used in these receivers ran very hot. This could eventually lead to its failure. Over the past few months I've ended up with some scrap PRD series receivers, whose tuners are very reliable. Recently an SS9000 came in with a duff tuner, though it was otherwise in excellent condition. So I decided to investigate the possibility of a PRD tuner transplant – with the minimum of alterations to the surface-mounted components.

This turned out to be very easy. The main requirements were to slightly attenuate the baseband output from the PRD tuner, and to add extra smoothing to the 5V supply.

The replacement tuner sits above the PCB horizontally (see Fig. 1), secured by its F socket. Extension wires are used to make the connections to the relevant PCB holes. The baseband video output is fed to the PCB via a 4·7kΩ preset which is mounted on the tuner – I adjusted it for no crushing on whites, with the receiver's contrast (set up 2, 5, 8 menu) set to medium. Extra smoothing can be added at the tuner's 5V input pin.

The print areas that were soldered to the original tuner's front lugs (the non F-socket end) must be linked together, as they connect two earthed print areas. Symptoms of missing print continuity here are dim LEDs and a rustling noise from the power supply. Solder a wire from the link to the replacement tuner's case. **H.C.**

Pace PRD800

We've had the "no sound with a blue screen" complaint several times now with these receivers. There have been several causes – the Nicky chip U9, the Q105 problem, and Q2 in the LNB power supply. This one would have been simple to deal with if I'd started at the right end. But with the silly ideas I get in my head I began messing about around the Nicky chip. After a while I decided to check the LNB voltage at the socket and found that it was zero. A look inside the tuner soon produced the answer: the centre pin of the socket had fallen off. **C.W.**

JVC TUAD1000

The customer complained that the "your card is invalid" message appeared when he removed the card and wouldn't change thereafter. At last a simple one: the card switch inside the reader slot was stuck.

This receiver has also appeared as the Cambridge ARD/ARX200, the BT SVS200, the Akai SX1000 and the Alba ISR7000/REC600. **C.W.**

Pace MSS1001-1

The moment this top-of-the range receiver was brought out of standby there was a tremendous screeching from all audio channels, both from the four on-board audio amplifiers and via the scart and UHF outputs. By monitoring the inputs and outputs around the audio processing chip U18, and by isolating the output pins 25, 26, 28, 29, 33, 34, 36 and 37 one at a time, I was able to establish that the noise was being generated within the IC itself, in the left-hand channel only. A replacement chip (type MSP3400C-C6, part no. 109 0340030) provided a complete cure. **J.C.P.**

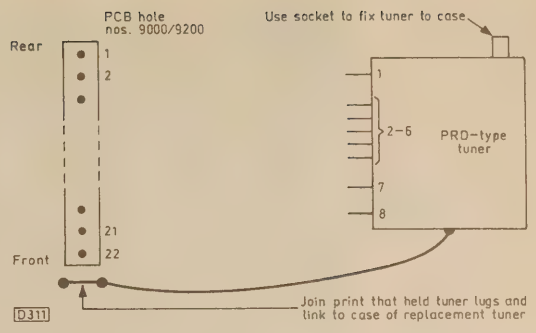


Fig. 1: Fitting a tuner from a Pace PRD series receiver to an SS9000 or SS9200. Tuner connections viewed from above. The pin connections are as follows:

Function	*9000/9200*	*PRD*
LNB supply	*4*	*1*
Prescaler output	*6*	*8*
5V supply	*12*	*5*
Tuning voltage	*13*	*7*
Baseband video output	*18*	*6*

Pins 2, 3 and 4 of the PRD tuner are not used.

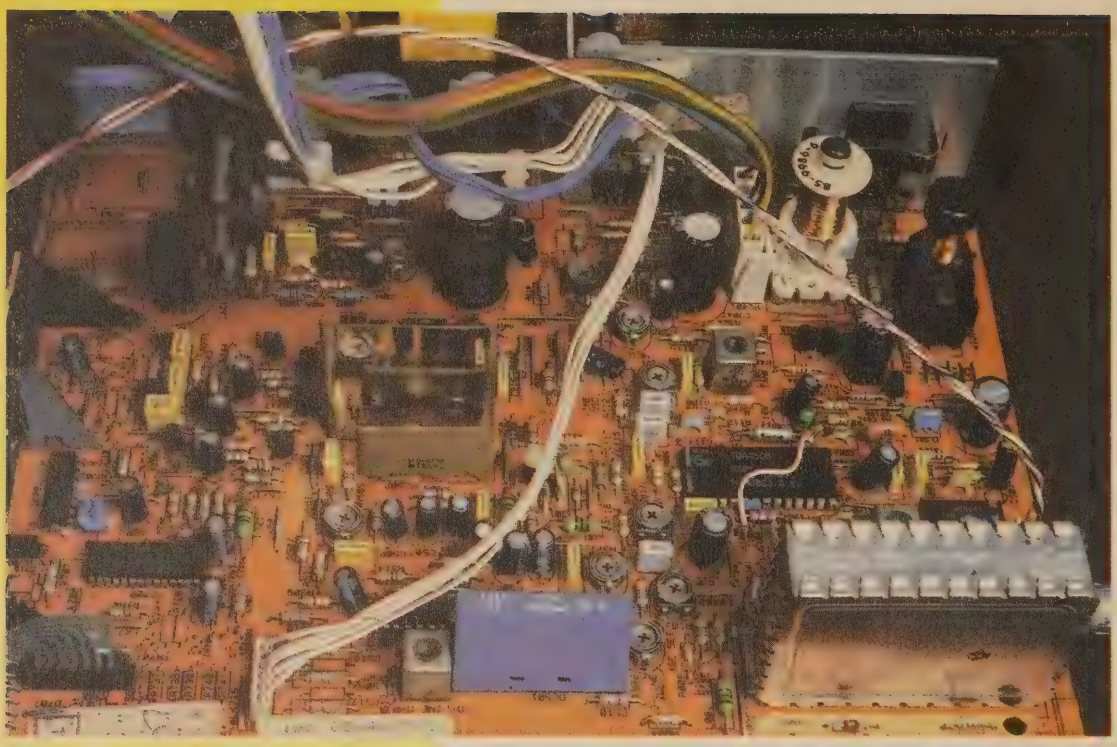
Pace PRD800

The symptoms were no decoding, no on-screen decoder messages ("Please Insert Card" etc.) and also lost video (blue screen) after removing the PCB from the case. I suspected the M50555 video graphics chip U10 as there was a video input at pin 13 but no output at pin 12, but it was OK. Next I suspected the TEA2130 sync separator chip U18 – there were no sync outputs at pins 15 (field) and 12 (line). U18 was also OK. The cause of the trouble was eventually traced to the 503kHz resonator X7 (part no. 171 0005030). **J.C.P.**

Pace MSS100

As a result of the recent thunderstorms a number of satellite receivers have come into my workshop with varying degrees of damage. Three MSS100 receivers that came in from different parts of the town were all dead: in each case the mains input fuse FS1 was open-circuit but not blackened, and tests failed to reveal any other damage. Replacement fuses (1A fast) restored normal operation, but as a precaution the receivers were given a two-day soak test before being returned to their owners.

The TOP200 type power supply is proving to be a robust little beast. A number of other machines received during the same period all needed major repairs to their power supplies, UHF modulators or tuners. **J.C.P.**



Servicing the Tatung 190 Series Chassis

John Coombes pays a return visit to these popular 14-21in. sets, with an up-dated run-down on possible faults

I have serviced a large number of these sets since last writing about them in the February 1996 issue. This up-date article presents latest information on faults and fault finding.

As with nearly all chassis, most faults relate to the power supply. The circuit of the FET chopper power supply used in this chassis is shown in Fig. 1.

No Results

The cause of loss of the sound and raster usually lies in the power supply. Mains switch S801 may be open-circuit. It can be all right electrically but operate incorrectly because the knob sticks. This can be dealt with by fitting a plastic collar, which is available from Tatung, to the switch spindle.

It is quite rare for the BY133 bridge rectifier diodes D801-4 to go short-circuit. If they do, the 3·3Ω, 4W surge limiter resistor R801 goes open-circuit. Should R801 be open-circuit with the bridge rectifier diodes OK, check the mains filter coil FL801 for dry-joints.

There are two start-up resistors, R802 and R803 (15kΩ, 0·5W), which tend to go open-circuit. Replace them as a pair. Later production sets have 16kΩ, 0·6W metal-film resistors in these positions. They are more reliable.

Check for dry-joints at the chopper transformer T801. These are usually at pin 8 or the surrounding area.

There are several causes of mains fuse blowing. The degaussing posistor R901 may be short-circuit. If the set works after replacing FS801 but the purity is incorrect, check the degaussing posistor R901 which can short intermittently. It can also blow itself in half – check by shaking R901 to see if it rattles. It's always worth checking the degaussing coils themselves for shorted turns, though this is a rare occurrence.

If FS801 has blown violently, check whether the wire-wound resistor R812 (33kΩ, 4W) has shorted to the chopper transistor's heatsink – this will also result in the transistor (TR801) going short-circuit.

TR801 can of course go short-circuit and blow the fuse. If this has happened the TDA4605 chopper control chip IC801 should also be replaced.

If the power supply is making a noise, check whether the BY396 17V supply rectifier D811 is short-circuit. If D811 has failed it may be necessary to replace TR801 and IC801 as well.

If the receiver is stuck in standby and R802/3 are OK, check whether D807 (BA157) is short-circuit. It may be necessary to replace IC801.

If the receiver is not in standby and there's no LED light, R810 (470kΩ, 0·5W) could be open-circuit. It's connected to pin 3 of IC801.

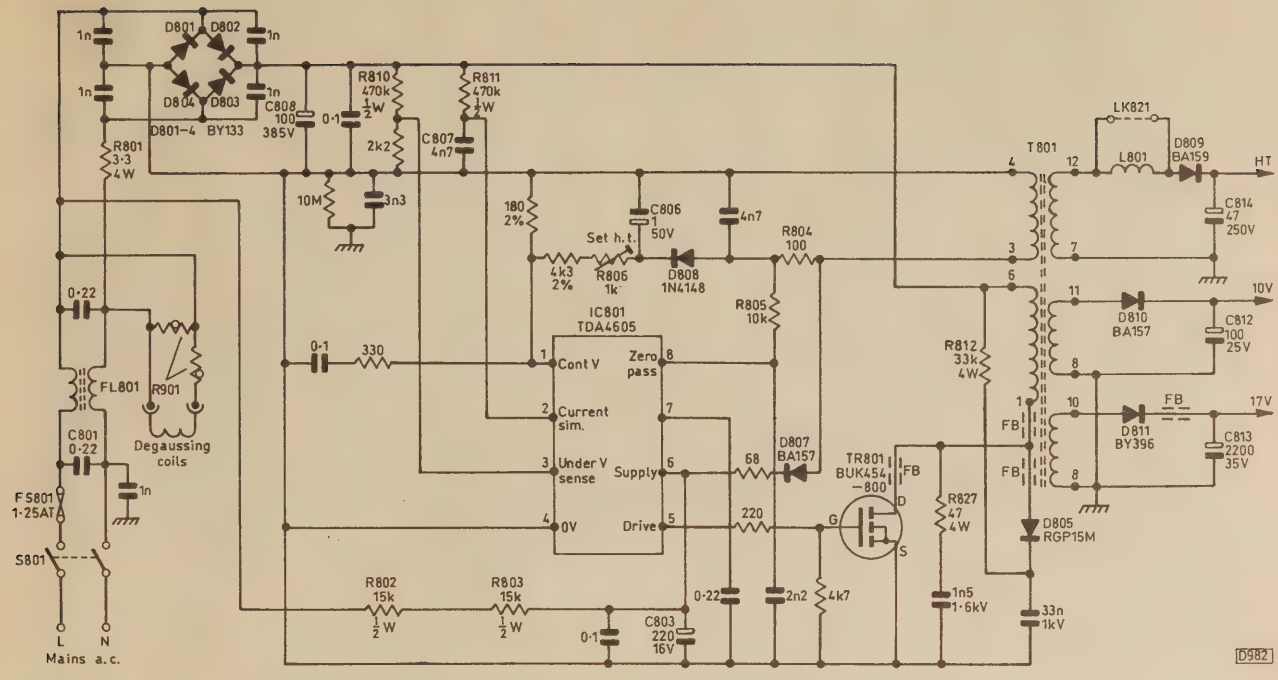


Fig. 1: The chopper power supply used in the Tatung 190 series chassis. In remote control versions S801 has an extra momentary-make contact. The HT voltage should be 115V with all except the 197 chassis (21in. FS tube) in which it should be 109·5V.

The 17V output supplies the line driver stage, the audio output stage and the 12V regulator IC803. The 10V output supplies the 5V regulator IC804.

If the primary side of the power suppy is OK, check whether the HT rectifier D809 (BA159) is open-circuit. If there's no HT or the HT is low, check the reservoir capacitor C814 (47µF, 250V) which could be short- or open-circuit.

C813 (2,200µF, 35V) can go short-circuit, removing the 17V supply. If the 10V supply is missing, check whether D810 (BA157) is open-circuit and check for a dry-joint at pin 11 of the chopper transformer.

If the 10V supply is OK, check the output from the 78M05CV 5V regulator IC804, at pin 3. If the 5V output is missing, check for dry-joints at IC804 or if necessary replace this device.

If necessary check for 12V at pin 2 of the LM317T regulator IC803. If the 12V supply is missing, check for dry-joints around IC803 and if necessary replace it.

Line Timebase

If the HT supply is missing, check whether the S2000AF line output transistor TR403 or, less likely, the BY133 efficiency diode D401 is short-circuit.

The line output stage tuning capacitor C404 (6·8nF) can go short-circuit (no HT) or open-circuit.

Also check for dry-joints at the pins of the line output transformer T402. Shorted turns within T402 will give no results or the same but with an audible buzz. For intermittent loss of the sound and picture, again check the transformer for dry-joints. The driver transformer T401 can also be dry-jointed.

For loss of line drive, first check the driver stage's 18Ω metal-film supply resistor R413 which tends to go open-circuit, in which case the associated 470µF smoothing capacitor C412 or the BC337 driver transistor TR402 could be short-circuit.

If there is a voltage reading at both ends of the driver transformer's primary winding but no line drive, check coil L401 for dry-joints.

The BC547 transistor TR401 can go short-circuit to remove the line drive.

If all these possibilities check out OK, the scan coils are suspect. They could have shorted turns, or there could be dry-joints at pins 3 and/or 5 of connector PL401.

Poor Focus

For this symptom check the setting of the focus control and ensure that the first anode preset is not at fault, causing excessive brightness with defocusing.

Field Faults

Field collapse is the most common fault here. The usual cause is the TDA3653B field output chip IC301, which can go short-circuit or cease to provide an output. If the chip fails again a short time after fitting a new one, replace the flyback boost capacitor C306 (100µF, 50V). If IC301's 25V supply is missing at pin 9, check whether C409 (1,000µF, 35V) is short-circuit or D403 (BA157) and/or R411 (10Ω) is open-circuit. Check for broken print at pin 9: if there is a break here, add a wire link and ensure correct soldering to prevent further problems.

Another possibility in the output stage is that D301 (1N4003) is open-circuit.

The field drive is generated by the TDA4505 multi-function chip IC101. If the output stage is OK, check for a drive pulse at pin 3 of IC101 and a field ramp at pin 2. If these are missing, check for 12V at pin 7. Check back to the 12V regulator IC803 if this supply is

missing. If the supply is present, replace IC101.

Other possible causes of field collapse are an open-circuit scan coupling capacitor (C304, 1,000µF, 35V), open-circuit field scan coils or dry-joints at pins 1 and 2 of connector PL401.

Sound Faults

The most common fault here is no sound because the LM380M audio output chip IC601 is faulty. The output coupling capacitor C610 (220µF, 25V) or the speaker can go open-circuit, and dry-joints can be present at pins 1 and 2 of plug/socket PL601.

If the output stage is operational, check IC101 (TDA4505) by replacement.

No Colour

This fault is quite rare. The possibilities are the TDA3565 colour decoder chip IC501, the associated 8·8MHz crystal XL501, dry-joints at the chroma delay line DL501, or loss of the sandcastle pulses at pin 7 of IC501. These come from pin 27 of IC101 (TDA4505), which may have to be replaced.

Loss of One Colour

Loss or intermittent loss of one colour usually means that the relevant RGB output transistor is faulty or dry-jointed. The transistors are TR201 red, TR202 green and TR203 blue, all type BF422.

If the DC conditions around these transistors are correct, use a scope to check the outputs from IC501 (TDA3565). R, G and B should be present at pins 10, 11 and 12 respectively. Replace IC501 if any of the outputs are missing.

Tuner/IF Faults

A snowy raster with noisy sound (white noise) can be caused by loss of the tuning voltage. Check whether R009 or R010 (both 6·8kΩ, 0·5W) is open-circuit or the TAA550 33V regulator IC001 is short-circuit. If the tuner's 12V supply is missing at pin 2, check whether C005 (47µF, 16V) is short-circuit. Alternatively the tuner could be faulty.

If there is a blank raster IC101 (TDA4505) could be faulty or the SAW filter FL101 dry-jointed.

Dry-joints at FL101 can also cause a ghosting effect with a good signal.

Incorrect Display Segments Alight

A wrong number display could mean that the seven-segment indicator D701 (type TLR332T) or its driver IC701 (TC4511BP) is faulty. First ensure that D701 is fitted in its socket correctly and that there are no dry-joints.

Remote Control Faults

No remote control operation could mean that the TFMP2380 IR receiver chip IC703 is faulty, but first ensure that its 5V supply is present at pin 1.

If the remote control unit isn't working, suspect the batteries and their connections – these could be corroded or broken. If the LED is dry-jointed, there will be no or intermittent operation. The legs of the crystal can break or become dry-jointed, again resulting in no or in some cases intermittent operation.

If selection of just one channel gives trouble, suspect a faulty button. Repair kits are available from various sources, but it's best to replace the unit.

MANOR SUPPLIES

Where can you buy your TV/VCR spares and discuss your fault with a fellow engineer at the same time?
With Manor Supplies you can!!
Quality TV/VCR spares supplied for engineers by engineers.

✷ Line output transformers ✷ Triplers ✷
✷ Remote Controls ✷ On/Off switches ✷
✷ Semiconductors ✷ VCR spares ✷
✷ Various Components for the TV/VCR Trade ✷

CRT Tester & Reactivator Kit £68.00+VAT

Line Output Transformer Tester £26.50+VAT

Video to RGB Converter £104.00+VAT

✷ Shop ✷ Mail Order ✷
172 West End Lane London NW6 1SD
Tel: 0171 794 8751/7346 Fax: 0171 431 5778
All major credit/charge cards accepted

Is looking for . . .
ICs TRANSISTORs SEMIs an up hill struggle?

A phone call to us could get a result. *We stock a very wide range . . . and with a World-wide database at our fingertips we are able to source even more. We specialise in devices with the following prefix (to name but a few):*
2N 2SA 2SB 2SC 2SD 2P 2SJ 2SK 3N 3SK 4N 6N 17 40 AD ADC AN AM AU BA BC BD BDT BDV BDW BDX BF BFR BFS BFT BGX BFY BLY BLX BS BR BRX BRY BS BSS BSV BSW BT BTA BTB BUW BU BUK BUT BUV BUW BUX BUY BUZ CA CD CX CXA DAC DG DM DS DTA DTC GL GM HA HCF HD HEF ICL ICM IRF J KA KIA L LA LB LC LD LF LM M MB MA MJB MAX MB MC MDA J MJE MJF MM MN MPS MPSA MPSH MPSU MRF NJM NE OM OP PA PAL PIC PN RC S SAA SAB SAD SAJ SAS SDA SG SI SL SN SO STA STK STR STRD STRM STRS SVI T TA TAA TAC TBA TC TCA TDA TDB TEA TIC TIP TIPL TEA TL TLC TMP TMS TPU U UA UAA UC UDN ULN UM UPA UPC UPD VN X XR Z ZN ZTX + others.
We can also offer equivalents (at customers' risk). We also stock a full range of other electonic components.
Mail, Phone, Fax, Credit Card orders & callers welcome

VISA Access Connect AMERICAN EXPRESS DELTA MasterCard

Cricklewood Electronics Ltd
40-42 CRICKLEWOOD BROADWAY LONDON NW2 3ET
TEL 0181 452 0161 & 450 0995 FAX 0181 208 1441

Win a Teletest PC with Accessories!

This month's free-to-enter prize draw offers readers the chance to win an Ozan Teletest PC pattern generator with carry case and mains adaptor. The hand-held Teletest PC provides anyone who services computers and monitors with a signal source to confirm operation and patterns for adjusting and setting up.

There are also five runner-up prizes consisting of £50 Teletest PC vouchers.

In reviewing the Teletest PC in our July issue (page 638) Philip Blundell commented as follows:

"PC monitor repairs nowadays provide a useful addition to the work load in many service departments, making a worthwhile contribution to the cash flow. But you need a signal source. The Ozan Teletest PC pattern generator is well worth considering. Being battery-powered (9V PP3 battery) and pocket-sized, it's ideal for field calls. The Teletest PC generates sync outputs for VGA and SVGA monitors – the ones you are most likely to encounter – and eight patterns that are essential for aligning and testing monitors.

The Teletest PC is fiddle-free, and really scores in its role as a piece of field test equipment."

To enter the competition, simply answer the following three questions:

(1) How many patterns does the Teletest PC generate?

(2) What battery does the Teletest PC take?

(3) Which two sync outputs does the Teletest PC provide?

Send you answers, with your name and address, to Teletest PC Competition, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, to arrive no later than September 30th. The first correct entry drawn from the sack after that date will win the Teletest PC, carry case and power supply. The next five correct entries will receive a £50 voucher off the cost of a Teletest PC. The Editor's decision will be final, and no correspondence can be entered into. Employees of Reed Business Information and Ozan are ineligible to enter. The competition is open to UK and overseas readers.

For an info pack on the Teletest PC, Freecall Ozan direct on 0500 009 070.

Long-distance Television

Terrestrial DX and satellite TV conditions and reception. News about the Clarke Belt and overseas TV. Details of a high-performance low-noise VHF preamplifier. Roger Bunney reports

Sporadic E reception predominated during June, with some decrease towards the end of the month. A bonus was provided by a tropospheric lift on the 4-6th, with enhanced Band III and UHF propagation from the north and north east. During this opening Ryn Muntjewerff received a Faroe Islands ch. E6 test pattern (identification Foroya Sjonvarp) in Holland, also Bergen/Oslo ch. E12 (with interference from German DAB transmitters). Cyril Willis (King's Lynn) also experienced excellent tropospheric reception during this period, again with signals from the NE and several new stations logged.

Here is the collated SpE log for the period under review:

3/6/97 HRT (Croatia) ch. E4; RAI (Italy) chs. IA, IB; Canal Plus (France) ch. L2; TVE (Spain) chs. E2-4; LTV (Lithuania) ch. R2; SVT (Sweden) chs. E2-4.
4/6/97 LTV R2; SLO (Slovenia) E3; RAI IA; Video (Italy) E2.
5/6/97 STV E2-4; YLE (Finland) E3; NRK (Norway) E2.
6/6/97 TVE E3; MTV (Hungary) R1; Video E2; Eesti TV (Estonia) R2.
8/6/97 SVT E2.
9/6/97 RTS (Bosnia) E3; HRT E4; TVE E2; RAI IA; Video E2.
10/6/97 RUV (Iceland) E4; SVT E2-4; RTP (Portugal) E2, 3; Video E2; TVE E2, 3; SVT E3.
11/6/97 TVE E2-4; RTP E2, 3; DR (Denmark) E3; MTV R1; RTS E3. It seems that Band I was jammed all morning.
12/6/97 TVE E2-4.
13/6/97 RAI IA, B; SVT E2-4; RTP E2, 3; TVE E4; Video E2.
14/6/97 RAI IA, B; RTS E3; HRT E4; TVR(Rumania) 2;C+ L2; MTV R1, 2; Syria E2; JTV (Jordan) E3; Iran E3; also an E2 Arabic floater.
15/6/97 TVE E2-4.
16/6/97 RAI IA, B; Video E2.
17/6/97 HRT E4; RTS E3; LTV R2; NRK E2; RAI IA; Video E2; Iran E3; TVR R2.
18/6/97 RAI IA; Video E2; HRT E4; SVT E2; LTV R2; RTS E3; TVE E2-4; BR (Germany) E2.
19/6/97 HRT E4; NRK E2; YT (Ukraine) R2.
20/6/97 RAI IA; Video E2; TVE E3; YT R2; Nova (Czech Rep.) R1; SVT E2; Arabic E2 signal.
21/6/97 TVE E2.
22/6/97 RAI IA, B; TVE E2, 3; TVA (Italy) IA; Video E2.
23/6/97 TVE E2; RTM (Morocco) E4; RAI IA; Video E2;NRK E2.
24/6/97 TVE E2.
25/6/97 TVE E2-4; RTP E3; RAI IA; Video E2.
26/6/97 TVE E2.
28/6/97 RAI IB; RTM E4; TVE E2, 3.
29/6/97 TVE E3; NRK E2, 3.
1/7/97 RAI IA, B.

Cyril Willis reports SpE reception of Iran ch. E3, Jordan ch. E3, Syria ch. E2 and another ch. E2 signal – suspected of being from the Lebanon or Dubai – during the month. These and other Arabic signals were "very strong indeed".

Overall a rewarding month, with something seen on most days and excellent tropospheric reception from Scandinavia in early June.

Writing from Australia, Robert Copeman (Victoria) mentions reception of all the Optus satellite channels at 224–300MHz from the south west during favourable tropospheric conditions. The signals are not permanently present, and suffer from severe fading. In view of the frequencies involved, it seems likely that the

Digital 'DX' reception via Intelsat K by John Locker, using his Nokia 9500 D-box.

source of the signals is a poorly-engineered cable distribution system in a block of flats or a hotel. The Melbourne Crown Casino/Hotel is some fifteen miles away from Robert and has the Optus Vision package distributed throughout the building. He wonders whether this is the source. I personally suspect it's more likely to be very close to his home. The source of the mystery ch. A0 (46·25MHz, vertical) ABC TV signal received daily is still unknown. It has been seen in Western Australia via SpE. The Australian Broadcasting Authority says that the transmission is not listed and that it has no ideas as to the possible source.

Satellite Sightings

At long last my satellite dish system is up and running. It consists of a Unicorn Satellite Systems 'Reference' dish with a Chaparral LNB and a Racal wideband polariser, with the feed taken via CT125 cable. But there have been a couple of problems. First the Pace positioner, in purely east-west use, seems to be reluctant to maintain readout accuracy between standby modes. Secondly a local planning enforcement officer has suggested that my two dishes are in breach of DOE regulations (February 1992). He has asked for a full planning permission application to ascertain whether they can remain. Only the top third of the main dish is visible above the 6ft fence, but that's enough to introduce the problem of planning compliance. I asked for 'officer approved temporary permission' until permanent permission for two dishes is, hopefully, obtained in about September, but this has been refused. The planners have called for application paperwork plus £90. I'll report as the story unfolds! In fairness, the coucil has been pleasant about the problem and says it only wants to regularise the situation.

As I type these lines on June 30th there has just been an evening news feed from Jersey, Channel Islands, to the BBC South West evening magazine programme via Orion 1 at 37·5°W. The analogue transmission, from the BBC UKI231 SNG truck, was reporting on the Island Games at St. Helier, with competitors from islands around the UK and elsewhere. A pleasant, parochial break from the high-profile Hong Kong handover featured by most other satellite carriers at the time. Orion carried the Denver Summit of Eight mid-month. A welcome sighting on the day I commissioned the dish, June 17th, consisted of colour bars with the identification "London Teleport HBO Test" via Eutelsat II F3 at 16°E. HBO is a major US cable carrier and programme producer: why the test at 16°E is a mystery.

Roy Carman (Isle of Wight) noted many corporate feeds to the UK from around the world: "Project Utopia", it transpired, was a mega outside broadcast event for British Airways to mark the change of corporate colours carried by the aircraft etc. The event started midday on June 9th and continued into the morning of the 10th. Live or recorded signals were received from Paris, Warsaw, Bangkok, Victoria Falls, Hong Kong, Berlin, various US airports etc. The BBC and Globecast managed signal distribution via Eutelsat, Telcom and Intelsat capacity. Telecom carried at least six international feeds via numerous transponders simultaneously. This suggests that Intelsat carried the original feeds in C band, with Eutelsat/Telecom providing the European downlinks. Other satellite enthusiasts noted an impressive edited compilation of Project Utopia's video feeds late in the morning of the 10th, via Telecom 2C. British Airways is obviously awash with funds!

Unfortunately I missed the Dr Dish programmes for satelite enthusiasts – they are transmitted on the second and fourth Friday each month via Kopernikus–2 at 28·5°E (tune to 11·55GHz vertical). To have clear sky from 16° to about 60°E is new for me.

American football dominated the Clarke Belt on the evening of the 14th, with both NTSC and PAL transmissions. We're now into long golf tournaments via Intelsat K and other summer sporting events. On June 15th a "TV Asawi Sports" feed from Holland to Tokyo featured a 24–hour race at the Nissan circuit. Even Michael Jackson popped up on the 14th, fresh from a concert in Germany.

A mid-afternoon feed from the Rolls Royce engine factory on the 15th featured a newly-designed engine to be used in the stretched A340 jet. This analogue feed was via Eutelsat II F2 (10°E) at 11·67GHz horizontal, using Optex hired equipment – the ident was "Optex UKI 178".

I was thus pleased to find that analogue satellite TV is alive and well on my return to the Clarke Belt after four months – the feeds have not all gone digital!

John Locker (Wirral) is one of the few who have taken up digital satellite TV reception. He says that it's rewarding once you have mastered the techniques. John uses a modified (Bentley Walker)

An analogue NTSC identification from CBS New York via Intelsat K.

Best seller
CDM-800 MULTI-SYSTEM DIGITAL CONVERTER
■ Professional quality, full digital processing
■ Accommodates input systems of NTSC 3.58, PAL and SECAM (optional 4.43 available)
■ Output systems NTSC 3.58, NTSC 4.43 and PAL
■ 4M bit field memory. Static resolution 500 lines, dynamic resolution 300 lines
■ Accommodates two inputs and two outputs
■ Built-in Time Base Correction (T.B.C.)
■ Line conversion: 525 to 625 lines, 625 to 525 lines ■ Field conversion: 60 to 50 and 50 to 60 fields ■ AC mains powered
£449.00 inclusive of VAT
HITACHI 21" MULTI-SYSTEM COLOUR TV. PAL/SECAM/NTSC (25" & 29" models also available)
■ Multi-System Reception System: RF: B/G/D/K/H/I-PAL, B/G/D/K/K'-SECAM M-NTSC VIDEO: NTSC 3.58, NTSC 4.43, NTSC 50 PAL 60 SECAM 60
■ Square flat picture tube
■ 40-program preset
■ AV terminals
■ Channel skip
■ Infra-red remote control
£399.00 inclusive of VAT
(AC/DC 230V/ 12-24V)
New Model
ROADSTAR PORTABLE COLOUR TV CTV-1007 Multi-System
10 inch colour television/monitor, multi-system (PAL B/G-I, SECAM B/G-D/K-L), 40 preset memories. On screen display, hyperband and full function remote control. Double A/V socket (SCART + RCA) and AC/DC 230V/12-24V operation PAL system I (for UK); PAL system B/G (for Europe); SECAM B/G (for Middle East etc); SECAM D/K (for Eastern Bloc); SECAM L (for France).
£299.00 inclusive of VAT, Special Offer
NEW NICAM MULTISYSTEM VCR THOMSON VPH6790 with VideoPlus +
■ Covers PAL 1 (for UK); PAL B/G (for Europe); SECAM B/G (for Middle East etc); SECAM D/K (for Eastern Bloc); SECAM L (for France); NISC 3.58 Playback & Record.
■ HyperbandTuner
■ 2 Scart Sockets
■ 99 Programmes
■ NICAM Hi-Fi Stereo
■ 4 Head
■ Long Play
■ VideoPlus +
■ 8 Event 1 year Timer
■ Infra Red Remote Control
£499.00 inclusive of VAT
(All above prices are inclusive of VAT, delivery by courier £10.00)
COMPREHENSIVE CATALOGUE
Features all the usual popular specialist products, together with many new items, Satellite, Multi-system TV's & VCR's, Converters, Decoders, Amplifiers and Aerials.
AVAILABLE BY RETURN OF POST FOR ONLY £1, or ring with your credit card.
Aerial Techniques
11 Kent Road, Parkstone, Poole, Dorset BH12 2EH
Tel: 01202-738232 Fax: 01202-716951

A shot from the British Airways's Project Utopia presentation via Telecom

Nokia 9500 D-box. By using hidden red menus he can store the various parameters – FEC (forward error correction), bit rates etc. – of known news and other feeds. This avoids the need to overwrite an original parameter set-up with a new, second set of data. He's receiving superb pictures from the main broadcasters such as Reuters and APTV. The signal from the LNB is fed via a splitter to his Echostar 8700 receiver (with DC pass) and Nokia box (with DC block): the 8700 thus controls dish operation and main tuning. He finds it advisable to switch the Nokia box to standby when moving the dish, otherwise it can lock up.

We'd welcome comments from other satellite "DXers" who are experimenting with digital signal reception. It seems that there is no such thing as a weak, sparkly digital signal: either the receiver locks to a strong signal or there's nothing at all.

Terrestrial TV News

UK: The ITC is currently seeking applications for Restricted Service TV Licences. There are two types. Type 1 is for a specific day or event of up to five days maximum. Type 2 is for a specific fixed location base and will run for a maximum of two years, after which the licence will be readvertised – assuming that the frequency is still available for the purpose. There's an application fee and an annual fee of £2,225.

Gibraltar: GBC is awaiting clearance from Brussels to go ahead with a second TV service. New equipment is planned for GBC-1 – valved gear is still in use. There are suggestions that the 1,458kHz medium-wave transmitter's power will be increased. George Gaskin adds that the aerial seems to be tilting!

Malawi: The first TV service, Hey-U Africa, is to open later this year. Another TV service, TV Malawi, is planned for the end of the year.

Finland: Nelonen, the new Channel Four Finland, started to operate on June 1st, initially via satellite and local cable systems. A terrestrial transmitter network is under construction. It should cover 75 per cent of the population by the end of the year. Vaajakoski ch. E50 and Jyvaskyla ch. E41 have already been received.

Mexico: VHF TV is expanding. TV Azteca has just ordered 44 VHF transmitters and one UHF transmitter, with aerials and associated equipment, for thirty sites throughout the country and another in El Salvador.

Greece: The government has issued licences to the national broadcaster ERT and a number of other broadcasters covering the 430 channels available. ERT has been granted licences for 65 channels. Star, TV Macedonia, Antenna, Mega, New Kanali 5, 902 TV and Sky are the other broad-casters. The new arrangements come into operation in December.

Hungary: The first two national commercial TV franchises have been awarded to consortia led by CLT–Ufa, Europe's largest broadcasting and entertainment group, and Scandinavian Broadcasting System, which is 22·8 per cent owned by Walt Disney.

Australia: Budget cuts across the board have been imposed on ABC. Apart from substantial job loses (700), all radio and TV programme services will lose around four per cent of income. Radio Australia will carry only English-language programming.

New Zealand: A youth channel aimed at 18-30 year olds was due to come into operation in July.

Satellite News

News from Intelsat of various satellite movements. The 803 craft will be launched in mid-September. It will take up position at 21·3°W, displacing 515 which will be moved to 31·4°W. Intelsat 506, which currently occupies this position, will be "de-orbited". Intelsat 804 is to go into orbit at a new position, 29·5°W, to serve African customers. Intelsat 801 is now in operation at 64°E. 802, launched in late June, is to operate above the Pacific Ocean – at 174°E. Future plans are to position 805 at 55·5°W and 806 at 40·5°W.

Canal Plus has registered a complaint with the EC against the Spanish government, which has stopped sales of Mediaguard Canal Plus digital TV decoders across Spain in favour of the decoding system used by state broadcaster RTVE. The Canal Satellite Digital package had gained 53,000 subscribers and was to increase its channels from 30 to 50.

The Italian government is seeking a common digital transmission standard for RAI, STET and Telepiu, which is now 90 per cent owned by Canal Plus.

France Telecom, Maxat and Keystone have formed the Globecast Communications Corporation with its HQ in Paris. The new global company, with interests in Europe, North and South America and parts of the East Pacific region, has access to a large number of satellites able to provide both analogue and digital services.

Another new name is NAPA Teleport, in California. This PanAmSat facility will provide direct uplinks to PAS-2 at 191°W and feeds to Europe via landline/satellite links and the PAS-1 and PAS-3 craft.

A fifteen per cent loss of power in the recently launched Tempo DBS satellite has delayed several PanAmSat launches, using the same Loral craft, while the cause of the problem is being investigated – modifications to the satellite may be required. The PAS-6 launch has been delayed from May to September and dates are awaited for PAS-7 and PAS-8.

The Brightstar International satellite operation has been taken over by BT Broadcast and Reuters, providing access to North America via Intelsat K.

Matra Marconi is to construct the new BSkyB digital TV uplink to Astra 2A at Chilworth, with 8·1m dishes. This will make Chilworth, just north of Southampton, the largest teleport in Europe.

DON'T MISS NEXT MONTH'S TELEVISION

To be certain you receive the leading UK consumer electronics journal next month and every month, subscribe today!

- **Free postage**
- **Priority despatch**
- **Subscribe for 24 or 36 issues and SAVE!**

☐ 12 issues (1Yr) £30 UK (Europe £46, Rest of World £56)
☐ 24 issues (2Yrs) £54 UK - SAVE 10%
☐ 36 issues (3Yrs) £72 UK - SAVE 20%

IN EVERY ISSUE

- News, equipment reviews, components, servicing solutions, business-building ideas
- Television, VCR, satellite, CDs, PCs, consumer electronics
- State of the art reports on digital TV and other developments

MONEY-BACK GUARANTEE OF SATISFACTION

If you are not completely satisfied with TELEVISION within the first 90 days we'll refund your money in full – no questions asked.

If you're an electronics professional you need to see 'Television' regularly!

Please allow 28 days for delivery of your first issue.

☐ Please tick here if you not wish to receive direct marketing promotions from other relevant companies.

FOUR WAYS TO PAY

1 I enclose a cheque for £ _____ made payable to TELEVISION

2 Please charge my Access / Visa / AMEX – Expiry date _____ / _____

_____

3 Please invoice me / my company ☐

4 Or alternatively phone our credit card hotline on +44 (0) 1444 445566

Name _____

Company Name _____

Company Address _____

_____

_____

Postcode _____

Telephone No. _____

Signature _____ Date _____

Return to: TELEVISION subscriptions, FREEPOST RCC 2619, PO Box 302, Haywards Heath, West Sussex, RH16 3BR.
NO STAMP NEEDED IF POSTED IN THE U.K

047

Low-noise VHF Preamplifier

Our thanks to Todd Emslie (Victoria, Australia) for sending us the circuit – see Fig. 1 – of the low–noise preamplifier he uses for F2 and meteor scatter reception in Band I and weak tropospheric reception in Bands II and III. It's based on a BF981 MOSFET, which achieves a noise figure as low as 0·7dB at 200MHz in an optimised circuit. In Todd's version the noise figure is under 1·5dB with a gain of typically 20dB across a single 6MHz channel bandwidth.

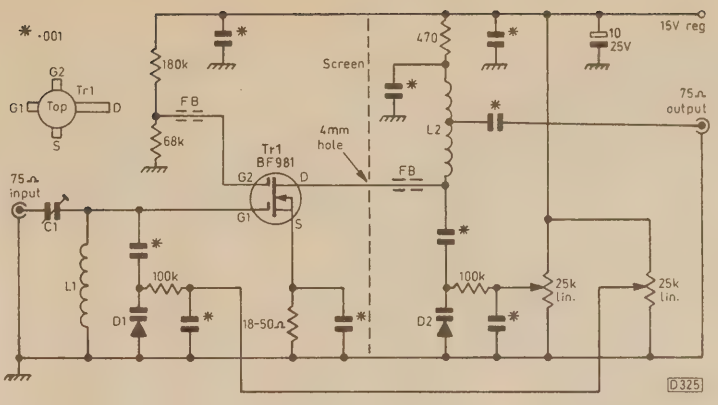


Fig. 1: Circuit diagram of Todd Emslie's low–noise VHF preamplifier.

The input, to gate 1 of Tr1, is tuned by L1 and D1. Tr2's drain is connected to a series tuned circuit consisting of L2 and D2. D1 and D2 are BB809 varicap diodes. For Band I operation, L1 and L2 set the basic frequency, the bandwidth being adjustable from 2MHz to over 6MHz by means of the two 25kΩ linear potentiometers which adjust the bias applied to D1 and D2 (a bandwidth of less than 2MHz might lead to instability). For Band II and III operation, the lower *Q* enables a single tuning potentiometer to be used.

Coils L1 and L2 are wound close spaced (wire diameter) using 0·5-1mm copper wire (19-22swg), e.g. coaxial cable inner conductor. Inside diameter is 0·25in. L2 is tapped a third of the way down from the LT supply end to provide a reasonable 75Ω match at the output. L1 is 13 turns and L2 12 turns for 45·7MHz; L1 is 6 turns and L2 7 turns for Band II (88-108MHz); L1 and L2 are both two turns for Band III (175-221MHz).

The value of Tr1's source resistor should be adjusted to provide a drain current of about 10-12mA. Its drain voltage should be approximately 10V while its grid 2 voltage should be around 4V.

C1 is a 1-10pF trimmer: adjust for maximum output – typically at 4·7pF. Todd uses 0·25W metal film resistors.

Provided construction follows conventional VHF practice, i.e. minimum lead lengths, a metal case (approximately 4·25 x 2·5in.) and screening between the input and output circuits, there should be no problems. Mount the components on a double–sided copper board bolted to the lid of the metal case.

Those happier with traditional air-spaced capacitors might try the Jackson C-82Y (3-20pF), deleting the tuning arrangements. The BB405B varicap diode could be used: its should cover the intended bands though the maximum capacitance is higher. 0·25W carbon resistors might be better at the higher frequencies, to avoid lossy inductive effects.

Alignment for a given channel is simple. Tune the input coil L1 (adjust the spacing) to the video carrier frequency and the output coil L2 to the audio carrier frequency. Peak C1 for maximum output both before and after aligning L1 and L2. Higher gain with reduced bandwidth and thus better noise performance would be achieved by aligning both L1 and L2 to the video carrier frequency, though this would result in a low audio output.

BB809 diodes and the BF981 transistor can be obtained from CirKit..

Mast for Sale

Does anyone want to buy my old 50ft non-telescopic lattice mast? It consists of five sections, each with three bolt-together sides, incorporating climbing rungs and a top cap for central positioning, with an internal lattice rotor mount and two rotors. The mast is now in store north of Romsey, Hants. It's going cheapish – buyer collects. If anyone is interested, drop me a line via the magazine.

Book Review

Digital Television – MPEG-1, MPEG-2 and the principles of the DVB system, by Hervé Benoit. Published by Arnold, a member of the Hodder Headline Group, at £19.99. 163 pages. ISBN 0 340 69190 5.

This timely and excellent book manages to cover a great deal of ground in its 160 or so pages. It does so because the author has given careful thought about how to arrange and present his information.

He starts with the TV systems we all know well – NTSC, PAL and Secam – as a way of briefly setting us on course. In this introductory section he also manages to provide clear and succint accounts of MAC and PAL+. We then proceed, in a logical sequence, through video signal digitisation, source coding (signal compression systems), source multiplexing (the arrangement of the MPEG-1 and MPEG-2 multiplexes, leading to the digital video braodcasting [DVB] standard), scrambling and controlled access, channel coding (the addition of error correction to the signal), carrier modulation with digital signals, digital TV reception and finally a section on future prospects. Subjects that might have impeded our progress through the basics of digital TV are then covered in a series of appendices, after which there is a really useful glossary of abbreviations, words and expressions.

Frankly I do not see how the subject could have been covered better. There are bits of mathematics here and there, but they don't get in the way and you never get bogged down by them – in fact the more obscure technical points are left to notes at the end of each section.

We are all going to have to learn about digital TV pretty soon, as the start of transmissions is due within a matter of months. This books tells you what you will need to know, and with its glossary etc. provides a ready reference source. There are numerous excellent diagrams throughout. Highly recommended.

The book can be obtained from Bookpoint Limited, 39 Milton Park, Abingdon, Oxon OX14 4DT. Tel. 01235 400 403, fax 01235 821 511. Make cheques payable to Bookpoint Limited. **J.A.R.**

Letters

We welcome letters from our readers and try to publish as many as we can. You can send them typed, handwritten, or on disc. Address them to the Letters Editor, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Mains Buffering

For some time I have been using a variant on Ian Rees's mains-buffering trip circuit (July issue). I use a smaller 150W halogen lamp as the buffer, with an Avo 8 in series to monitor the current. The arrangement is particularly useful when powering heavy audio amplifiers after repair: with the buffering trip in use, the meltdown effect often noted in the past as the quiescent current potentiometers are gingerly advanced is almost always prevented.

Some items we get for repair however, ones that use an auto-voltage sensing circuit to adopt to either American 110V or European 240V mains supplies, incorrectly select the 110V option when powered via my 150W load. Another unit that we occasionally see, also dual-voltage but with a manual selector, operates OK with 110V but switches in its voltage-doubler circuit when fed with 240V. The post-inrush current consumption is the same as that with normal 240V operation, so the crowbar doesn't fire. Much smoke ensues.

My advice is "build one and use it" – it will save you bucketfulls of fuses and hours of frustration, but beware that there are pieces of kit out there that do not take kindly to current limiting. It took me a day and a half and a dozen V-FETs to discover that the first such item I came across had been successfully repaired and worked all right when not powered via the buffer.

Adrian Spriddell,
Micomicon Electronic Services,
Diss, Norfolk.

Panasonic G Deck

A couple of points need to be made regarding John Coombes's notes on the Panasonic G deck in the April issue (page 400). First, the capstan motor. If the clutch sticks, with the result that there is mistiming, it's the rotor (part no. VXP0777, now VXP1113) that needs replacement (any confusion between motor and rotor was probably an editorial fault – *Editor*). If there's no motor operation (no functions) thet stator (different part nos. for different models) and bearing need replacement.Secondly, with a number of direct drive drum motors the drive PCB, which contains the Hall devices and drive circuitry, is available separately at reasonable cost. There is thus no reason to replace a highly expensive drum because of a fault on the drive PCB. Thirdly, the back tension should be 22·5-27·5g at the start of an E180 tape. Fourthly, the VXL1500 capstan brake is used in only early versions of the deck. The vast majority use the different VXL1873, which has been superseded by the VXL2088. Finally, one should be careful about following the alignment instructions in the original G mechanism manual: there are several mistakes that mean it won't work! Follow the instructions in my articles in the May and June 1991 issues of *Television*.

In the same issue Chris Watton refers to loss of the R – Y signal in the Salora J chassis (page 444). This is a confusing but quite common fault. The cause would have been slight misadjustment of the field hold control RT400: resetting cures the symptom. What happens is that the set flips to the NTSC/60Hz mode. The clue is excessive height – it's not just a chroma fault! If the poentiometer is noisy, replace it.

On page 445 Terry Lamoon refers to a Sony Model KVX2982 with sound faults. Other symptoms include random display of the Nicam symbol. Sony recommends replacing RA2 and RA3 on board A – these are surface-mounted resistor arrays, and the new types are of modified construction.

Nick Beer,
Bideford, North Devon.

TDA8178S Chip

In the last two issues Michael Dranfield and Mark Allen have mentioned difficulty in obtaining the TDA8178S chip, which is used in the field output stage in the Mitsubishi Model CT21ASTX (Euro 12 Chassis). A replacement kit (part no. H27P014020) for this is available from Mitsubishi at £17.25 plus £4.50 handling charge and VAT. A similar kit (for 21 and 25in. models) is available from Irwin Electronics (Unit 200, JC Albyn Complex, Burton Road, Sheffield S3 8BX – 0114 273 9622) at £3.45 plus VAT and 95p postage. It pays to shop around!

Derek Townsend,
Townsend's Televisions,
Matlock, Derbyshire.

Editorial note: Our thanks also to Maurice Jones of Blackburn, Lancs who provided information on this subject.

Viability of Servicing

The viability of servicing low-cost electronic equipment has been questionable for years. Radio sets and Walkmans can be bought more cheaply than the labour cost of a repair.

As a retired professional engineer, I keep my hand in by maintaining the family's TV sets, VCRs etc., the satisfaction of achieving a successful repair being higher than that of completing *The Times* crossword – and my labour cost is nil. When my Sharp VLC7450E camcorder started to play up however (it took fifteen minutes for the auto exposure to settle down to the correct level, being OK after that) I knew it would have to go to professionals with the knowledge and test gear required to deal with it.

So I took it to a local Sharp

agent, who later rang me up to ask if I would pay £10 carriage to send it to SharpServ. I agreed. Two weeks later he phoned to say that he could offer four options:

(1) Repair the camcorder at a cost of £865, half as much again as it cost.

(2) Exchange it for the current model, at a cost of £600 (£550 in any Dixons etc.).

(3) Dispose of the camcorder "free of charge".

(4) Return the camcorder unrepaired at a cost of £57 plus £10 carriage.

I took the last option. So it cost me £70 to get the camcorder back in the same condition it left me. Apparently the cause of the fault was PCB corrosion because of the famous leaky capacitors.

I agree with paying for an estimate, but only if it can be an even remotely viable proposition to go ahead. Sharp commiserated when I wrote to the company, but was not prepared to take any further action as the camcorder was out of guarantee. It seems that Sharp does not feel itself to be responsible for the failure of capacitors in seldom-used, low-voltage equipment. SharpServ also commiserated, but explained that as a commercial operation these are the prices that have to be charged to stay in business.

In conclusion, it seems that servicing low-cost goods is no longer viable and the same now applies with high-cost items. For how long will we have a servicing industry?
B.C. Lewis,
Pembroke, Pembs.

No Longer Available?

The number of manufacturers that will not deal with someone who does not have a trade account has risen substantially in recent years. Those without such an account are referred to an official spares distributor. But when the distributor tells you that a part is no longer available, are you to believe it?

About a year ago I needed a part for a Matsui microwave oven. The distributor I contacted told me it was no longer available. A call to Partmaster (Mastercare) revealed that this was totally untrue.

I have now been waiting for two weeks for an Alba part from the same distributor. When I chased this up I was told that it was no longer available. Alba says that it's in stock and I should contact the distributor.

Let this be a word of warning to other traders. If necessary, check the availablility of a part with the manufacturer. If your customer takes his equipment to another dealer who can obtain the part, you will be left with egg on your face.
Keith Pemberton,
Southampton, Hants.

In Guarantee Spares

We have had problems recently in a number of cases where spares have been required for equipment still covered by a manufacturer's warranty – delays of up to two months have not been uncommon. As a result the customer loses faith in the product and the manufacturer, and very often the dealer has to provide a free-of-charge loan set while the part is being obtained.

Many manufacturers seem to be hell bent on production down to a price rather than up to a quality, but at least we should be able to expect of them that all service spares are held in stock.

I would be interested to know how a dealer stands legally in such cases, particularly when the customer insists on a replacement because of the delay. I understand that some manufacturers, notably Sony, offer to replace in-warranty equipment should it not be possible to supply a functional part within 28 days of ordering. Other manufacturers should follow this lead.
Shane Humphrey,
Bideford, North Devon.

Well done Bush/Alba

You probably know what it's like phoning a manufacturer or distributor for some technical help with a repair. Even if the company actually employs somebody to deal with queries, and you don't have to hold an account to talk to someone, getting relatively basic information can be a trial.

I was pleasantly surprised therefore when I had occasion to phone Bush recently – I don't have a direct account with this company. I was put through to a technician who was not only very helpful but in addition arranged for a small part I needed urgently to be sent free of charge. It arrived next day. But please don't all rush to your phones, and I won't embarrass the person concerned by giving you his name. Suffice it to say that I was able to complete the repair of what was a budget-priced piece of equipment quite cost-effectively without the need to buy a service manual. A colleague in Croydon has told me a similar story about, you guessed it, Bush! Well done indeed.

Isn't it time that all manufacturers and distributors in our industry were required to provide a user-friendly technical service? One of the worst cases I've come across of stupidness by a major manufacturer went like this. I phoned the manufacturer, with whom I have an account, to ask for a service manual for a product about six years old. Sorry, it's not available as it is out of print. I phoned the technical department, which has a manual. Could it be photocopied? Sorry, this might infringe copyright!

I thought this a good one, unless someone out there knows of a better one?
Colin Pearse,
A.E.S. Electrics,
Merstham, Surrey.

Satellite Installation

I've read with interest articles on satellite dishes, siting problems and test equipment. Long retired from the TV field, I'd no suitable test gear to help with such an installation. So I called in an installer. The results were OK until we had the builders in to replace the flat roof. The dish was moved, also of course the signal.

I like a challenge, and decided that if I took a TV set up to the roof adjustment might be within my capabilities. I have an old 9in. Sony monochrome TV set with a tinted screen and an attached battery pack – so old that it's actually dual-standard! But with its help I soon found that adjustment was not difficult and resolved very good pictures. Meters are no doubt fine, but as in the old days installation is surely best when you can scrutinise an actual picture.
Philip Bearman,
New Barnet, Enfield.

Lamp Interference

The Hitachi TV set in my living room recently ceased to function correctly. It seemed that the microcontroller system was corrupted. My mind being a little more active than my body (my workshop is about 50 yards away), I coupled the set to my VCR via a scart lead and used the VCR as a tuner – only as a temporary measure of course! Then, after a few minutes' viewing, I noticed that the LED channel display was more entertaining than the programme. Random numbers and bars were being displayed, though

the picture remained perfect. The set then went into standby. Microcontroller trouble I thought, and switched the set back on again. When I switched off the wall light opposite the TV set the display functioned normally and the set stayed on.

The wall light is fitted with one of those high-efficiency fluorescent lamps. Its heaters must have been emitting infra-red radiation which was modulated by the HF-driven inverter that excites the tube.

It's not the first time that I have come across this effect. I nearly lost a rental customer who complained that his TV set kept changing channels spontaneously. After replacing the remote control receiver and then the set to no avail, I noticed that he had a chandelier with five of these lamps in the centre of the room. A brief experiment with a piece of black sticky tape to mask the IR receiver confirmed the cause of the problem.

Peter Nutkins,
Charmouth, Dorset.

Worth it for a Laugh

For once the workshop was quiet. A couple of VCRs and three or four TVs were on the rack awaiting spares. Apart from that there were no outstanding jobs, and I sat waiting for the phone to ring. It did. At the other end there was an American with a VCR problem that was clearly the centre of a family debate. After a couple of diagnostic suggestions from his relatives he told me that the unit concerned, an old Sharp VC9800, would only partly accept a tape. "The last son of a bitch took me half an hour to remove" he said. After weighing the damage that this might have caused against the fact that the machine is of sturdy build, I decided to accept the job.

The VCR came in next day. Its owner mentioned that he'd bought the machine simply because it would play NTSC tapes. I couldn't argue about that! On opening the machine I discovered, to my horror, that Darth Vader's light sabre was entangled with the eject mechanism. The plastic toy was easily removed by cutting the sabre from Darth's clutches and operating the mechanism to remove it. After that the machine seemed to have escaped damage from its 'run in' with the empire.

When I phoned the customer to explain what had happened he told me that his five-year old son places objects in the recorder hoping to see them on the screen. I told him that a copy of *Star Wars* might, in the long run, be cheaper. I charged him £5. It was worthwhile for the laugh.

Richard Knotek,
Woking, Surrey.

Correspondent Please

I am anxious to correspond with one of your technician readers. At present I'm serving a prison sentence, with about five years to go. Before coming into prison I used to repair TV sets, VCRs etc. What I need is to keep up to date with the trade, with a view to setting up my own repair business on release – rather than being a burden to the state.

I realise that as a prisoner I am not exactly popular, but I am remorseful for the crime committed and am just looking for a bit of help. A friend supplies me with copies of *Television.*

Don Sobey, CN3217, HMP Full Sutton, Moor Lane, York YO4 1PS.

Answer to Test Case 417

– see page 791 –

Roger finally sorted out the Mitsubishi HSB12 VCR – though he much prefers repairs that involve head cleaning or replacing duff mains on/off switches! But he should have been able to find the cause of the trouble without too much difficulty: he had forgotten to check one of the vital feedback signals to the main microcontroller chip, the SW25 pulses. Without these pulses the chip thinks that the drum isn't rotating.

The SW25 pulses should be present at pin 21 of the main microcontroller chip. There was nothing here. Nor were there any pulses at pin 14 of the servo chip IC4A0, or at pin 20 where the PG pulses should have been present (the SW25 pulses are derived from the PG pulses via a divider circuit within IC4A0). In fact the drum motor was faulty. Although it produced PG pulses when its board was flexed, it was not repairable and had to be replaced.

Many VCRs that carry out the fast-forward and rewind operations without the tape being laced around the drum do not require PG pulses for these operations to be maintained. This could have mislead Roger. The HSB12 carries out its fast-transport operations with the tape 'half-laced' – it just touches the front of the drum – but the microcontroller chip nevertheless requires assurance that the head is rotating.

NEXT MONTH IN TELEVISION

Workshop Supplement

When did you last review your workshop needs – service equipment, tools, servicing accessories and aids? Needs keep changing, and there's always something that will make life easier. Next month's guide surveys products currently available for the workshop and lists suppliers.

Getting into Digital TV

You're going to have to, before long! So next month we're starting a new series, by J. LeJeune, that will go through what you need to know about digital TV and end up with some practical guidance on digital satellite TV receiver fault finding.

A Handful of Mitsubishis

John C. Priest sees a lot of Mitsubishi TVs in his neck of the woods. He provides a round-up of recent fault experiences.

Simple Intercom System

Andrew Tebbutt describes a very simple intercom system that, unlike other designs, does not require push-to-talk working and has full duplex operation.

Satellite Mods

Martin Pickering on how to convert the Pace PRD800 to provide 199-channel capability.

Published on the third Wednesday of each month by Reed Business Information Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. **Filmsetting** by Marlin Imaging Ltd., 2-4 Powerscroft Road, Sidcup, Kent DA14 5DT. **Printed** in England by BPC Magazines (Carlisle) Ltd., Newtown Trading Estate, Carlisle, Cumbria CA2 7NR. **Distributed** by MarketForce (UK) Ltd., 247 Tottenham Court Road, London W1P 0AU (0171 261 7704). **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd. ***Television*** is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

TELEVISION INDEX/DIRECTORY AND FAULTS DISCS PLUS REPRINTS SERVICE

INDEX DISC

Version 5 of the computerised index to TELEVISION magazine covers Volumes 38 to 46 (1988 – 1996). It has thousands of references to TV/VCR fault reports and articles, with synopses. A TV/VCR spares guide, an advertisers list and a directory of trade and professional organisations are included. The software is easy to use and very quick. It runs on any IBM or compatible PC with 512K RAM and a hard disc. Price £30 (3.5"HD, alternatively 3.5DD" or 5.25" if required) Those with previous versions can obtain an upgraded version for £15. Please quote the serial number of the original disc.

FAULT REPORT DISCS

Each disc contains the full text for TV, VCR, camcorder, satellite TV and CD fault reports published in individual volumes of TELEVISION, giving you easy access to this vital information. Note that the discs cannot be used on their own, only in conjunction with the Index disc: you load the contents of the Fault Report disc on to your computer's hard disc then access it via the Index disc. Fault Report discs are now available for Volume 38 (November 1987 – October 1988); Volume 39 (November 1988 – October 1989); Volume 40 (November 1989 – October 1990); Volume 41 (November 1990 – October 1991); Volume 42 (November 1991 – October 1992); Volume 43 (November 1992 – October 1993); Volume 44 (November 1993 – October 1994); Volume 45 (November 1994 – October 1995); Volume 46 (November 1995 – October 1996). Price £15 each (3.5"HD, alternatively 3.5"DD or 5.25" if required).

REPRINTS

Reprints of articles from TELEVISION back to 1986 are also available: ordering information is provided with the index, or can be obtained from the address below. Hard copy indexes of TELEVISION are available for Volumes 38 to 46 at £3.50 each.

All the above prices include UK postage and VAT where applicable. Add an extra £1 postage for overseas EC orders, or £5 for non-EC overseas orders. Cheques should be made payable to SoftCopy Ltd. Allow 28 days for delivery (UK).

SoftCopy Limited, 1 Vineries Close, Cheltenham GL53 0NU, UK. Telephone 01242 241 455

EX RENTAL TV-VCR STOCK

Small direct loads 50/70 units mainly Ferguson F/S/T & Fastext, most working.
Large direct loads 500 units – Salvage Stock, Working Stock, Ready to retail from older Basics to Nicam Stereo.
Collect your own from Nuneaton or delivery arranged (within reason).

For details of prices and availability call

Bob At T.H.V. TV
01457 530711

STARVISION

SUPPLIERS OF HIGH QUALITY EX RENTAL - EX DISPLAY TV & VIDEO

ALL SETS ARE FULLY SERVICED WITH REMOTE CONTROLS AND ARE READY FOR RETAIL SALE

MOST POPULAR MAKES ALWAYS IN STOCK AT PRICES THAT WON'T SHOCK

**ALL PRICES INCLUDE V.A.T.
NO MINIMUM QUANTITY**

**RING TODAY FOR LATEST PRICES
TELEPHONE
0121 502 3016 - 0121 505 1033**

**STARVISION
UNIT A, BRUNSWICK PARK ROAD
WEDNESBURY, WEST MIDLANDS
WS10 9QR**

vista electronics LTD

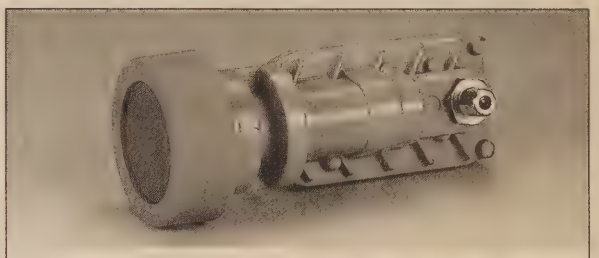
LNB's *Now Down in Price*

VECCOM

DUAL POLE SINGLE OUTPUT - V/H SWITCHABLE
KU BAND - ASTRA COMPATIBLE

I/P FREQ.	10.95-11.7GHz	O/P FREQ.	950-2050MHz
LO FREQ.	10.00MHz	NOISE FIG.	1.0dB TYPICAL

PT NO 40030NE PRICE £ 16.25



VECCOM

DUAL POLE SINGLE OUTPUT - V/H SWITCHABLE
KU BAND - ASTRA 1D COMPATIBLE

I/P FREQ.	10.7-11.8GHz	O/P FREQ.	950-2050MHz
LO FREQ.	9.750MHz	NOISE FIG.	1.0dB TYPICAL

PT NO 40030R PRICE £ 16.25

CONTINENTAL MICROWAVE

DUAL POLE SINGLE OUTPUT - V/H SWITCHABLE
KU BAND - ASTRA 1D COMPATIBLE

I/P FREQ.	10.7-11.8GHz	O/P FREQ.	950-2050MHz
LO FREQ.	9.750MHz		
NOISE FIG.	0.8dB TYPICAL		

PT NO 40004R PRICE £ 18.40

GRUNDIG SUPER AUNIS

DUAL POLE SINGLE OUTPUT - V/H SWITCHABLE
KU BAND - UNIVERSAL

I/P FREQ.Band I	10.7-11.8GHz	Band II	11.8-12.75GHz
LO FREQ. Band I	9.750MHz	Band II	10.06MHz
O/P FREQ.	950-2050MHz	NOISE FIG.	0.8dB TYPICAL

PT NO 40026R PRICE £ 24.28

40005R	***CONTINENTAL MICROWAVE UNIVERSAL 0.8dB***	£ 19.75
40009R	***CAMBRIDGE AE14 UNIVERSAL 1.0dB***	£ 22.20
40028R	***GRUNDIG TWIN UNIVERSAL 0.7dB***	£ 62.10

For further details of our full range of LNB's please contact our sales office

Tel: 01429 838057 Fax: 01429 837101

vista electronics LTD
Manufacturers of television tube and video heads

TV/VCR COMPONENTS AND SERVICE ACCESSORIES

LNB'S DOWN IN PRICE

NO CARRIAGE CHARGE FOR ORDERS ABOVE £10

5% DISCOUNT ON ALL VIDEO HEAD ORDERS OVER £20

SEND FOR COMPONENTS CATALOGUE

THOUSANDS OF NEW 'B' GRADE AND RE-GUNS IN STOCK
LARGEST STOCKIST IN THE UK

TUBES
CARRIAGE EXTRA

TELEPHONE COMPONENTS 01429 838057 FAX
TUBES 01429 837100 01429 837101

VISTA ELECTRONICS LTD, UNIT 1B, WINGATE GRANGE IND EST
WINGATE, CO DURHAM TS28 5AH

Access VISA

TV WHOLESALE

TV WHOLESALE

C.T.V.

UNIT 5, THE PHOENIX BUILDING, RUSHOCK TRADING ESTATE, DROITWICH ROAD, DROITWICH WR9 0NR
TELEPHONE: 01299-251522
0589-888021/0850 486147 (24HR)

SUPPLIERS OF HIGH QUALITY
GRANADA AND THORN
EX-RENTAL TELEVISIONS AND VIDEOS
LARGE STOCKS ALWAYS AVAILABLE
ALL AT COMPETITIVE PRICES
Satellite Receivers
Complete Range of Hand Sets
EXPORT ENQUIRIES WELCOME
OPEN: MON-FRI – 9.30-5.30

TEL: 01299-251522

Fax: 01299-251543

• PANASONIC • SONY • PIONEER • AIWA • GOLDSTAR • HITATCHI • BUSH •

LANWAY TRADING LTD

• SHARP • MITSUBISHI • PHILIPS • KENWOOD • JVC • TOSHIBA •

THE UK'S LEADING SUPPLIER OF NEW & GRADED TV'S & VIDEOS

FOR THIS MONTH'S SPECIAL PACKAGE PRICES

TELEPHONE: 0161 203 5666
FACSIMILE: 0161 203 5261

UNIT 8 B, VALE PARK • HAZELBOTTOM ROAD • CRUMPSALL • MANCHESTER • M8 0QT

W.M.T.V.

THE LARGEST INDEPENDENT WHOLESALERS IN WALSALL
– SUPPLIERS OF HIGH QUALITY EX-RENTAL TVs AND VIDEOS TO THE TRADE AT COMPETITIVE PRICES
ALSO AVAILABLE: NEW B-GRADE PRODUCTS – TVs, VIDEOS, AUDIO & MICROWAVES – ALL TESTED & BOXED
Satellite Receivers and Export Enquiries Welcome
½ Mile off Junction 10 M6. *Easy Parking Facilities*
UNIT 3, BENTLEY LANE BUSINESS PARK
BENTLEY LANE, WALSALL WS2 8TL
Tel: 01922-724542. Fax: 01922-722208
Mobile: 0831-246622 (24 hours)

OPEN:
MON-FRI,
9-6pm
SAT 9-2pm
SUNDAY BY APPOINTMENT
DELIVERY SERVICE THROUGHOUT THE COUNTRY

NOW OPEN

IN NORTH EAST – W. TREE TRADE WAREHOUSE
UNIT 9A/9B CARRMERE RD, LEACHMERE IND ESTATE, SUNDERLAND SR2 NTE
TEL 0191 5211500
GRADED STOCK ALL BOXED TESTED + WORKING

14" Remote Portables	£79
14" Fastext	£95
14" Televideo	£175
20" Remote	£79
20" Text	£95
21" Remote	£89
21" Nicam	£129
20" Televideo	£235
25" Fastext	£195
25" Nicam Fastext	£235
28" Nicam Fastext	£255
L/P Videos	£89
C/D Midi Systems	from £75

Various makes

Ex Rental TVs, lots of 50
25 x Basic 25 x Remotes £500
Front Loading Videos. Lots of 10 – £150

Parcels of FST TVs £35 each
Parcels of Videos £35 each
Various late models

FRONT LOADING VIDEOS - WORKING £40 EACH

W. TREE TRADE WAREHOUSE

Unit 1, Sunshine Mills, Wortley Rd, Leeds
Tel: (0113) 2638804 Fax: 2310275

CENTREVISION

WANT TO BUILD YOUR OWN RENTAL BUSINESS

We Stock Tatung + Akai Ex Rental TV/VCR + plenty of spare chassis

Also we are Konig spares distributors of Lopt chips VCR spares

We stock too much to list Our prices are for your ears only

RING NOW DARE YOU WENDY

Sloper Road, Leckwith,
Cardiff CF1 8AB

VISA **01222 344754**
01222 344218 Access

CAMPION WHOLESALE LTD.

QUALITY USED TV & VIDEO

COMPLETE RANGE OF TVs VIDEOS AND SATELLITES

Most makes and models available
TVs from £3.00 • Satellites from £8.00
Videos from £15.00
Prices Ex-VAT

Free Delivery Service to most areas of the UK

U.K.s Largest Export Wholesaler
Specialists in conversions to most countries systems

UNIT 75, BARRACKS ROAD, SANDY LANE INDUSTRIAL ESTATE, STOURPORT-ON-SEVERN, WORCESTERSHIRE DY13 9QB
Just 10 Mins from M5 Junct. 6 Worcs North

01299-879642 (3 lines)
FAX: 01299 827984

TUBES

SPECIAL PURCHASE allows us to offer the following popular tubes at £20 off our normal prices:-

48 ECR .....
510 UFB .....
59 TMZ .....
66 EAS .....
66 ECF .....
66 EAF .....
66 ECY .....

1,000s of C.R.T.s in stock

Ring Irene or Jane for price and availability

Access VISA

EXPRESS TV

The Mill, Mill Lane,
RUGELEY, Staffs WS15 2JW
Tel: 01889 577600
Fax: 01889 575600

TV WHOLESALE

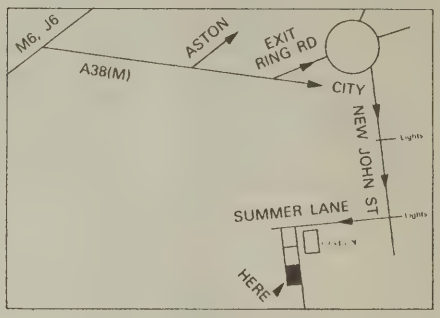
COLOURTRADE

ESTABLISHED 1973 – WHOLESALE ONLY

NEW 'B' GRADE

Major Brands ONLY. TV's – Video – Audio. Microwaves, Satellite Receivers, Decoders. Camcorders – Phones/Fax
COMPLETE BOXED – WITH STAND – HANDSET – BOOK ETC
MINT LATEST NICAM FASTEXT F.S.T.

EXPORT AGENTS FOR THE FOLLOWING
TV, VIDEO, HI-FI, CAMCORDERS, SATELLITE
WHITE GOODS, HEATING EQPT., VACUUM CLEANERS, KITCHEN APPLIANCES, GARDEN EQUIPMENT, POWER TOOLS



FERGUSON

FULL RANGE – ALL CURRENT MODELS OF TV-VIDEO IN STOCK No minimum quantity

NATION-WIDE NEXT DAY DELIVERY SERVICE – VISITORS BY APPOINTMENT

Phone 0121-359 7020

FAX 0121-359 6344

221-222 BRIDGE ST WEST, HOCKLEY
BIRMINGHAM B19 2YU – JUST OFF M6-J6

AMERICAN EXPRESS · VISA · MasterCard · DINERS CLUB INTERNATIONAL

BESCO LTD

YOUR PREMIER SUPPLIER FOR OVER 30 YEARS
NEW STOCKS ARRIVING DAILY

ENTIRE RANGE OF EX RENTAL TVs, VIDEO, B GRADE HI FI, PORTABLE CD, GHETTO BLASTERS ETC

F.S.T. remote working	**from only £60**	complete with handset, makes inc. Solara,
F.S.T. text working	**from only £70**	Philips, Sanyo, Hitachi etc.

Nicam videos from **£70** – Over 200 working video recorders in stock from **£40** (slim front loaders)

100s of front loading videos off the pile **from £12** – Philips, Hitachi, Sanyo, Sharp, etc.

A/B GRADE LONG PLAY VIDEOS – BOXED £55, VIDEO PLUS £60

Large Quantity of (off the pile) TVs £5
Good Quality working TVs from £15. Teletext from £30

Hi Fi

Micro Systems with CD £35, Midi Systems £40
Upmarket Hi Fi Systems: JVC, AIWA, KENWOOD, PIONEER, ETC.
Stack Systems, Separates, all boxed. Large Quantity of Ghetto Blasters from £25

★ This month only all prices include VAT ★

Walker House, 16 Bottomley Street, Bradford BD5 7LJ
Ring Tony 01274 308186 –
Open 6 days – 9am - 4.30pm

FAX: 01274 722229

REPO WHOLESALE

DAISY WORKS, 345 STOCKPORT ROAD
LONGSIGHT, MANCHESTER M13 0LF
0161-273-2854/274-3409/Fax 273-4486

TOP QUALITY CLEAN WORKING FST

GOOD QUALITY "TOP RANGE" WORKING VIDEOS

If you are in the area call in and see what we can offer

COMPETITIVE PRICES

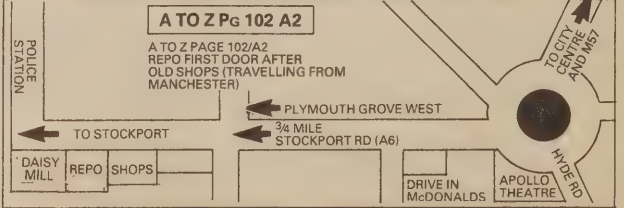
★ REGULAR SUPPLIES ★

PLEASE PHONE FOR CURRENT STOCK POSITION

★ NEW HANDSETS IN STOCK ★

No order too small – If you are new to the business call in and let us help you

CHEQUE/CASH/ACCESS/VISA/AMEX ETC.



GAS HOBS Standard domestic units, new and boxed, 3 burner, household gas, brown. Bargain at just £12.95 ref BAR316

INFRA RED FILM 6" square piece of flexible infra red film that will only allow IR light through. Perfect for converting ordinary torches, lights, headlights etc to infra red output only using standard light bulbs Easily cut to shape. 6" square £15 ref IRF2

HYDROGEN FUEL CELL PLANS Loads of information on hydrogen storage and production. Practical plans to build a Hydrogen fuel cell (good workshop facilities required) £8 set ref FCP1

STIRLING ENGINE PLANS Interesting information pack covering all aspects of Stirling engines, pictures of home made engines made from an aerosol can running on a candle! £12 ref STIR2

12V OPERATED SMOKE BOMBS Type 3 is a 12v trigger and 3 smoke cannisters, each cannister will fill a room in a very short space of time! £14.99 ref SB3. Type 2 is 20 smaller cannisters (suitable for simulated equipment fires etc) and 1 trigger module for £29 ref SB2 Type 1 is a 12v trigger and 20 large cannisters £49 ref SB1

HI POWER ZENON VARIABLE STROBES Useful 12v PCB fitted with hi power strobe tube and control electronics and speed control potentiometer. Perfect for interesting projects etc 70x55mm 12vdc operation. £6 ea ref FLS1, pack of 10 £49 ref FLS2

NEW GEIGER COUNTERS IN STOCK Hand held unit with LCD screen, auto ranging, low battery alarm, audible 'click' output. New and guaranteed. £129 ref GE1

RUSSIAN BORDER GUARD BINOCULARS £1799 Probably the best binoculars in the world! ring for colour brochure.

RUSSIAN MULTIBAND WORLD COMMUNICATIONS RECEIVER, Exceptional coverage of 9 wave bands, (5 short, 1 LW, 1FM, 1MW) internal ferrite and external telescopic aerials, mains/ battery. £45 ref VEGA

NEW LASER POINTERS 4.5mw, 75 metre range, hand held unit runs on two AA batteries (supplied) 670nm. £29 ref DEC49

HOW TO PRODUCE 35 BOTTLES OF WHISKY FROM A SACK OF POTATOES Comprehensive 270 page book covers all aspects of spirit production from everyday materials. Includes construction details of simple stills etc. £12 ref MS3

NEW HIGH POWER MINI BUG With a range of up to 800 metres and a 3 days use from a PP3 this is our top selling bug! less than 1" square and a 10m voice pickup range. £28 Ref LOT102.

BUILD YOU OWN WINDFARM FROM SCRAP New publication gives step by step guide to building wind generators and propellors. Armed with this publication and a good local scrap yard could make you self sufficient in electricity! £12 ref LOT81

PC KEYBOARDS PS2 connector, top quality suitable for all 286/ 386/486 etc £10 ref PCKB. 10 for £65.

NEW LOW COST VEHICLE TRACKING TRANSMITTER KIT £29 range 1.5-5 miles, 5,000 hours on AA batteries, transmits info on car direction, left and right turns, start and stop information. Works with any good FM radio. £29 ref LOT101a

HIGH SECURITY ELECTRIC DOOR LOCKS Complete brand new Italian lock and latch assembly with both Yale type lock (keys inc) and 12v operated deadlock. £10 ref LOT99

***NEW HIGH POWER WIRELESS VIDEO AND AUDIO BUG KIT 1/2 MILE RANGE** Transmits video and audio signals from a minature CCTV camera (included) to any standard television! Supplied with telescopic aerial. £169

CCTV PAN AND TILT KIT Motorize your CCTV camera with this simple 12vdc kit. 2 hermentically sealed DC linear servo motors 5mm threaded output 5 secs stop to stop, can be stopped any where, 10mm travel, powerful. £12 ref LOT125

CCTV CAMERA MODULES 46X70X29mm, 30 grams, 12v 100mA. auto electronic shutter, 3.6mm F2 lens, CCIR, 512x492 pixels, video output is 1v p-p (75 ohm). Works directly into a scart or video input on a tv or video. IR sensitive. £79.95 ref EF137.

IR LAMP KIT Suitable for the above camera, enables the camera to be used in total darkness! £6 ref EF138

UK SCANNING DIRECTORY As supplied to Police, MOD,M15 and GCHQ! coverers everything from secret government frequencies, eye in the sky, prisons, military aviation etc £18.50 ref SCANB

INFRA RED POWERBEAM Handheld battery powered lamp, 4 inch reflector, gives out powerful pure infrared light! perfect for CCTV use, nightsights etc. £29 ref PB1.

SUPER WIDEBAND RADAR DETECTOR Detects both radar and laser , X K and KA bands, speed cameras, and all known speed detection systems. 360 degree coverage, front &earwaveguides,

1.1"x2.7"x4.6" fits on sun visor or dash £149 ref

CHIEFTAN TANK DOUBLE LASERS 9 WATT+3 WATT+LASER OPTICS

Could be adapted for laser listener, long range communications etc Double beam units designed to fit in the gun barrel of a tank, each unit has two semi conductor lasers and motor drive units for alignement. 7 mile range, no circuit diagrams due to MOD, new price £50,000? us? £199. Each unit has two gallium Arsenide injection lasers, 1 x 9 watt, 1 x 3 watt, 900nm wavelength, 28vdc, 600hz pulse frequency. The units also contain an electronic receiver to detect reflected signals from targets. £199 for one. Ref LOT4.

NEW LOW PRICED COMPUTER/WORKSHOP/HI-FI RCB UNITS Complete protection from faulty equipment for everybody! Inline unit fits in standard IEC lead (extends it by 750mm), fitted in less than 10 seconds, reset/test button, 10A rating. £6.99 each ref LOT5. Or a pack of 10 at £49.90 ref LOT6. If you want a box of 100 you can have one for £250!

TWO CHANNEL FULL FUNCTION B GRADE RADIO CONTROLLED CARS From World famous manufacturer these are returns so they will need attention (usually physical damage) cheap way of buying TX and RX plus servos etc for new projects etc. £12 each sold as seen ref LOT2.

MAGNETIC CREDIT CARD READERS AND ENCODING MANUAL £9.95 Cased with flyleads, designed to read standard credit cards! complete with control elctronics PCB and manual covering everything you could want to know about whats hidden in that magnetic strip on your card! just £9.95 ref BAR31

WANT TO MAKE SOME MONEY? STUCK FOR AN IDEA? We have collated 140 business manuals that give you information on setting up different businesses, you peruse these at your leisure using the text editor on your PC. Also included is the certificate enabling you to reproduce (and sell) the manuals as much as you like! £14 ref EP74

HIGH POWER DC MOTORS, PERMANENT MAGNET 12 - 24v operation, probably about 1/4 horse power, body measures 100m x 75mm with a 60mm x 5mm output shaft with a machined flat on it. Fixing is simple using the two threaded bolts protruding from the front of the motor 4mm x 12mm). These motors are perfect for model engineering etc they may even be suitable as a cycle motor? We expect high demand so if you would like one or think you may require one in the future place your order today! £22 ref MOT4 10 pack £185 ref MOT5B

ELECTRONIC SPEED CONTROLLER KIT For the above motor is £19 ref MAG17. Save £5 if you buy them both together, 1 motor plus speed controller rrp is £41, offer price £36 ref MOT5A

RUSSIAN 900X MAGNIFICATION ZOOM MICROSCOPE metal construction, built in light, mirror etc. Russian shrimp farm!, group viewing screen, lots of accessories. £29 ref ANAYLT.

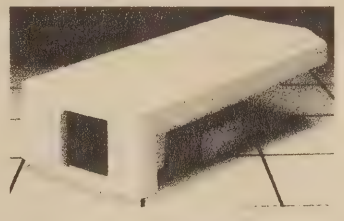
AA NICAD PACK Pack of 4 tagged AA nicads £2.99 ref BAR34

RUSSIAN NIGHTSIGHTS Model TZS4 with infra red illuminator, views up to 75 metres in full darkness in infrared mode, 150m range, 45mm lens, 13 deg angle of view, focussing range 1.5m to infinity. 2 AA batteries required. 950g weight. £199 ref BAR61. 1 years warranty

LIQUID CRYSTAL DISPLAYS Bargain prices,
20 character 2 line, 83x19mm £3.99 ref SMC2024A
16 character 4 line, 62x25mm £5.99 ref SMC1640A

TAL-1, 110MM NEWTONIAN REFLECTOR TELESCOPE Russian. Superb astronomical 'scope, everything you need for some serious star gazing! up to 169x magnification. Send or fax for further information.20kg, 885x800x1650mm ref TAL-1, £249

YOUR HOME COULD BE SELF SUFFICENT IN ELECTRICITY Comprehensive plans with loads of info on designing systems, panels, control electronics etc £7 ref PV1



COLOUR CCTV VIDEO CAMERAS, BRAND NEW AND, CASED, FROM £99.

Works with most modern video's, TV's, Composite monitors, video grabber cards etc Pal, 1v P-P, composite, 75ohm, 1/3" CCD, 4mm F2.8, 500x582, 12vdc, mounting bracket, auto shutter, 100x50x180mm, 3 months warranty,1 off price £119 ref XEF150, 10 or more £99 ea 100+ £89

YUASHA SEALED LEAD ACIDS FROM £2.50 12v 6.5Ah ex equipment batteries to clear at just £9.99 for a pack of four! ref XX1

A MAGNET THAT LIFTS 33 KILO'S!

Just in this week are these incredible magnets that lift 33 kilo's! Price is £14.99 ref MAG33

25 SQUARE FOOT SOLAR ENERGY BANK KIT 100 6"x6" 6v Amorphous 100mA panels, 100 diodes, connection details etc to build a 25 square foot solar cell for just £99 ref EF112.

CONVERT YOUR TV INTO A VGA MONITOR FOR £25! Converts a colour TV into a basic VGA screen. Complete with built in psu, lead and s/ware.. Ideal for laptops or a cheap upgrade.Supplied in kit form for home assembly. **SALE PRICE £26** REF SA34

***15 WATT FM TRANSMITTER** Already assembled but some RF knowledge will be useful for setting up. Preamp req'd, 4 stage 80-108mhz, 12-18vdc, can use ground plane, yagi or dipole £69 ref 1021

***4 WATT FM TRANSMITTER KIT** Small but powerful FM transmitter kit. 3 RF stages, mic & audio preamp included £24 ref 1028

YUASHA SEALED LEAD ACID BATTERIES 12v 15AH at £18 ref LOT8 and below spec 6v 10AH at £5 a pair

ELECTRIC CAR WINDOW DE-ICERS Complete with cable, plug etc **SALE PRICE JUST £4.99** REF SA28

AUTO SUNCHARGER 155x300mm solar panel with diode and 3 metre lead fitted with a cigar plug. 12v 2watt. **£12.99** REF AUG10P3.

SOLAR POWER LAB SPECIAL You get 2 6"x6" 6v 130mA cells, 4 LED's, wire, buzzer, switch + 1 relay or motor. **£7.99** REF SA27

SOLAR NICAD CHARGERS 4 x AA size £9.99 ref 6P476, 2 x C size £9.99 ref 6P477

GIANT HOT AIR BALLOON KIT Build a 4.5m circumfrence, fully functioning balloon, can be launched with home made burner etc. Reusable (until you loose it!) £12.50 ref HA1

AIR RIFLES .22 As used by the Chinese army for training puposes, so there is a lot about! £39.95 Ref EF78. 500 pellets £4.50 ref EF80.

***NEW MEGA POWER VIDEO AND AUDIO SENDER UNIT.** Transmits both audio and video signals from either a video camera, video recorder, TV or Computer etc to any standard TV set in a 500m range! (tune TV to channel 31) 12v DC op. Price is £65 **REF: MAG15** 12v psu is £5 extra **REF: MAG6P2**

***MINATURE RADIO TRANSCEIVERS** A pair of walkie talkies with a range up to 2 km in open country. Units measure 22x52x155mm. Including cases and earp'ces. 2xPP3 req'd. £37.00 pr. **REF: MAG30**

***FM TRANSMITTER KIT** housed in a standard working 13A adapter!! the bug runs directly off the mains so lasts forever! why pay £700? or price is £18 REF: EF62 (kit) Transmits to any FM radio. Built and tested version now available at £45 ref EXM34

***FM BUG BUILT AND TESTED** superior design to kit. Supplied to detective agencies. 9v battery req'd. £14 REF: MAG14

GAT AIR PISTOL PACK Complete with pistol, darts and pellets £14.95 Ref EF82B extra pellets (500) £4.50 ref EF80.

HEAT PUMPS These are mains operated air to air units that consist of a aluminium plate (cooling side) and a radiator (warming side) connected together with a compressor. The plate if inserted into water will freeze it. Probably about 3-400 watts so could produce 1kw in ideal conditions. £30 ref HP1

3 FOOT SOLAR PANEL Amorphous silicon, 3' x 1' housed in an aluminium frame, 13v 700mA ouput. £55 ref MAG45

SOLAR/WIND REGULATOR Prevents batteries from over charging. On reaching capacity the regulator diverts excess power into heat avoiding damage. Max power is 60 watts. £27.99 ref S/CA11-/05

4X28 TELESCOPIC SIGHTS Suitable for all air rifles, ground lenses, good light gathering properties. £24.95 ref R/7.

NICAD CHARGERS AND BATTERIES Standard universal mains operated charger, takes 4 batts + 1 PP3, £10 ref PO11D. Nicads- AA size (4 pack) £4 ref 4P44, C size (2 pack) £4 ref 4P73, D size (4 pack) £9 ref 9P12.

PHOTOGRAPHIC RADAR TRAPS CAN COST YOU YOUR LICENCE! The new multiband 2000 radar detector can prevent even the most responsible of drivers from losing their licence! Adjustable audible alarm with 8 flashing leds gives instant warning of radar zones. Detects X, K, and Ka bands, 3 mile range, 'over the hill' 'around bends' and 'rear trap facilities. micro size just 4.25"x2.5"x.75", Can pay for itself in just one day! £89 ref EP3.

STEREO MICROSOPES BACK IN STOCK Russian, 200x complete with lenses, lights, filters etc etc very comprehensive microscope that would normally be around the £700 mark, our price is just £299 (full money back guarantee) full details in catalogue.

SECOND GENERATION NIGHT SIGHTS FROM £748 RETRON Russian night sight, 1.8x, infra red lamp, 10m-inf, standard M42 lens, 1.1kg. £349 ref RET1

MAINS MOTORS 180 RPM 90X70mm, 50X5mm 50x5mm output shaft, start cap included. £22 ref MGM1

PC POWER SUPPLIES, CUSTOMER RETURNS, ALL FAN COOLED, OUR CHOICE, BARGAIN AT 8 PSU'S FOR £9.99 REF XX16

LOW COST CORDLESS MIC 500' range, 90 - 105mhz, 115g, 193 x 26 x 39mm, 9v PP3 battery required. £17 ref MAG15P1

JUMBO LED PACK 15 10mm bicolour leds, plus 5 giant (55mm) seven segment displays all on a pcb £8 ref JUM1. Pack of 30 55mm seven seg displays on pcbs is £19 ref LED4, pack of 50 £31 ref LED50

12VDC 40MM FANS MADE BY PANAFLO, NEW. £4. REF FAN12

WIND GENERATORS 380 WATT

1.14 metre dia blades, carbon matrix blades, 3 year warranty, 12vdc output, 24v version available, control electronics included, brushless neodymium cubic curve alternator, only two moving parts, maintenance free, simple roof top installation, start up speed 7mph, max output (30mph) 380w. £499 ref AIR1

Check out our WEB SITE
full colour interactive
1997 catalogue
http://www.pavilion.co.uk/bull-electrical

FREE COLOUR CATALOGUE WITH EVERY ORDER

*SOME OF OUR PRODUCTS MAY BE UNLICENSABLE IN THE UK

WE BUY SURPLUS STOCK FOR CASH
SURPLUS STOCK LINE 0802 660335

BULL ELECTRICAL

250 PORTLAND ROAD, HOVE, SUSSEX. BN3 5QT. (ESTABLISHED 50 YEARS).
MAIL ORDER TERMS: CASH, PO OR CHEQUE WITH ORDER PLUS £3.50 P&P PLUS VAT.
24 HOUR SERVICE £4.50 PLUS VAT.
OVERSEAS ORDERS AT COST PLUS £3.50

'phone orders: 01273 203500
(ACCESS,VISA, SWITCH, AMERICAN EXPRESS)
FAX 01273 323077
E-mail bull@pavilion.co.uk

THORNS
RENTAL
GRANADA

CENTRAL TV
WHOLESALE DISTRIBUTION LTD

THORN TX9, TX10, TX100 FST
please ring now for best prices

FOR BEST DEALS ON
DORICS MK4, MK4A Basics...
RING NOW!

GRADED TVs
AND VIDEOS:
POA

FULL RANGE OF
PANASONIC VIDEOS
NOW IN STOCK: POA

WORKING VIDEOS
NOW FROM ONLY:
£30.00

FOR ALL EXPORT
ENQUIRIES TV AND VIDEOS,
CALL OUR BIRMINGHAM
OFFICE NOW!

PHILIPS FST
G90 Teletext
working £75
B/W £35

ATTENTION ALL BULK BUYERS
RING NOW FOR DIRECT LOADS

LARGE SELECTION OF SLIMLINE
VIDEOS, FULL REMOTE from £45.00

Finlandia Nicam TV
21″/24″/28″ models:
D66J25x8 D66J26x2 C51H26x17
C59HP6x7 C59HZx3 C66H25x8
C66HZ6x5 C59GZ7x4

SATELLITES, VIDEO CRYPT
SRX200, SRD400, PACE 9000 9200 IRD
PACE 800, VIDEOCRYPT, AMSTRAD
510 540 AND MORE: POA

WORKING PORTABLE
from only £35
LARGE SELECTION OF FST TVs
from £45

London contact: Joshi
Eley Estate, Nobel Road,
Edmonton N18
Tel: 0181-807 4090 Fax: 0181-884 1314

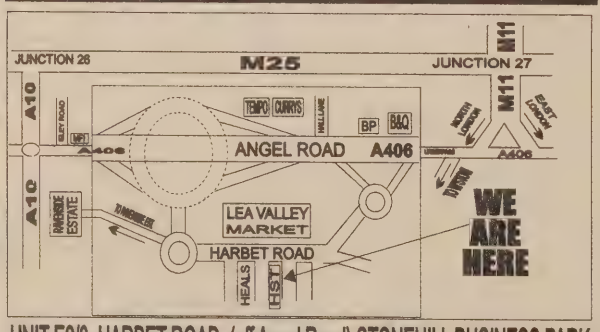
Birmingham contact: Mick
369 Startford Road, Sparkhill,
Birmingham B11 4JY
Tel: 0121-772 1591 Fax: 0121-766 6383

HST
APPROVED TELEPRICE DISTRIBUTOR

DISTRIBUTORS
LONDON

Suppliers of high quality
EX-RENTAL & GRADED
TV's AND VIDEO's
Direct From Source

PHONE FOR DELIVERY DAYS ON
0181 - 803 0505



UNIT E2/3, HARBET ROAD, (off Angel Road), STONEHILL BUSINESS PARK,
LEA VALLEY TRADING ESTATE, LONDON. N18 3LD

DELIVERY SERVICE AVAILABLE

DARTEL
ELECTRONICS

8 Heather Park Drive, Alperton,
Wembley, Middlesex HA0 1SL

Tel: 0181 795 1735 Fax: 0181 795 1736

SUPPLIERS OF HIGH QUALITY AUDIO VIDEO/TV EQUIPMENT – GRADE A STOCK WITH WARRANTY

Popular brand names at competitive prices, eg:

Video Recorder, LP/SP, from.....£85.00
Video Recorder, LP/SP, VideoPlus from £95.00
Twin Deck Video Recorders.....£145.00
20in TV/Video Combi £235.00
14in TV/Video Combi £180.00
Microwaves, Digitouch, from £47.00
Camcorders, from.....£165.00
Triple Disc HiFi Systems from.....£120.00

Televisions, all sizes including Prologics, Nicam, VCRs etc

PHONE OR FAX FOR FULL LIST

WE ARE NOT EX-RENTAL DEALERS

ALL PRODUCTS SUPPLIED ARE CURRENT LINES
ALL PRICES SUBJECT TO VAT PLUS CARRIAGE AND AVAILABILITY

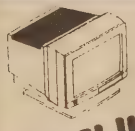
No other consumer magazine in the country can reach so effectively those readers who are wholly engaged in the television and affiliated electronics industries. They have a need to know of your products and services.

CLASSIFIED

PHONE 0181-652 8339 FAX 0181-652 8931

The prepaid rate for semi display setting is £13.50 per single column centimetre (minimum 4 cm). Classified advertisements £2.00 per word (minimum 20 words), box number £22.00 extra. All prices plus 17½% VAT. All cheques, postal orders etc., to be made payable to Reed Business Information. Advertisements, together with remittance, should be sent to Television Classified, 11th Floor, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

SERVICE MANUALS & TECHNICAL BOOKS



SIZZLING SUMMER OFFER

On our Computer Monitor CD-ROM's Compilation

We now have 5 CD-ROM's containing Service Data and Circuits for hundreds of Computer Monitors from a vast range of manufacturers. For a limited period if you purchase any 4 you can take the 5th one FREE.

Normal price 1 off is £44.95 + VAT
Any 2 or more they are £39.95 + VAT each.
Order any 4 at £39.95 + VAT each and take the 5th one FREE.

DON'T DELAY - ORDER TODAY

Full details on the contents of each CD-ROM shown on our web site and in our catalogue
All orders plus post/packing £2.94

We have the largest range of Service Information and Technical Data obtainable anywhere.
For Televisions, Video Recorders, Test Equipment, Computer Monitors, Vintage Wireless, Domestic Equipment etc etc.
In fact practically anything electronic.
Originals or Photostats as available.

Also available. Our catalogue detailing Hundreds of Technical Books and Repair Guides. Return coupon for your FREE copy. The entire index of manuals we have is available on PC disc for just £3.50 + VAT (Total £4.11) with FREE updates.

MAURITRON TECHNICAL SERVICES (TV)
8 Cherry Tree Road, Chinnor, Oxfordshire, OX9 4QY
Tel:- 01844-351694. Fax:- 01844 352554.
Email:- sales@mauritron.co.uk Our catalogue is now on the Web at http://dialspace.dial.pipex.com/mauritron/

Please forward your latest catalogue for which I enclose 2 x 1st Class Stamps.
Please forward your 5 Monitor CD-ROMs Compilation set for which I enclose payment of £190.70 inclusive.
Please supply Index on PC Disc for £4.11 inclusive.

NAME _____ *Circle items required*
ADDRESS _____
_____
POSTCODE _____ You may pay by Cheque, PO or Visa, Access, Delta, Electron, JCB, Mastercard, Eurocard etc
☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
EXPIRES_____ SIGNATURE_____

SERVICE MANUALS

Thousands of different models available
For most U. K. European, Far East & USA makes
Prices (Stock Items):–

VCR	–	£13.00
CTV	–	£8.00
MTV	–	£6.00

Other items, prices on request
P/P etc. (any quantity) add £2.00
Do not add any VAT
Cheque/PO with order only please.

D-TEC
PO BOX 1171, FERNDOWN, DORSET BH22 9YG
Tel: 01202 870656

Fryerns
Service Information **FES** *Circuit Diagrams*
TV'S, VCR's SATELLITE AUDIO & HI-FI
Most models/makes old & new covered.
Also fault guidance service available
Prices are from £3.50 + £2.50 P/P
i.e. 1 item – total £6.00 inc.
2 items – total £9.50 inc.
3 items – total £13.00 inc.
4 items – total £16.50 inc.
Payment by credit card or Postal Order for next day delivery. Cheques to clear.
Tel/Fax 01268 470899
24hr Answerphone outside office hours
PO Box 5830
Basildon
SS13 3RX

SERVICE MANUALS
Have you ever turned away work for want of a Service manual?
Have you ever bought a service manual and never used it more than once?
Then why not join...
THE MANUALS LIBRARY
For details and membership application form write, phone or fax:
HARVEY ELECTRONICS
43 Loop Road, Beachley, Chepstow, Gwent NP6 7HE
TEL: 01291 623086 Fax: 01291 628786
VISA, ACCESS accepted

SERVICE MANUALS
Brown Goods, TV, Video
Microwave, In Car & Camcorder
Major brands Sony, Panasonic, Aiwa, Akai
Approx 10,000 units mixed
Offers £2,000 o.n.o.
Tel: 01952 619552

CLASSIFIED TEL:0181 652 8339

REPAIR INFORMATION

NEW EDITIONS !! NEW EDITIONS !! NEW EDITIONS !!

OVER **17,250 FAULTS** AVAILABLE
BOOK FORMAT OR PC DISK VERSION

Fault Indexes in book format

Latest release - Edition 18 of the Television Magazine Index, Covers over **13,700** Television, Video, Satellite, Camcorder & Compact Disc faults, Large easy to read **A4** format, The newest addition to a highly acclaimed series. In daily use in workshops across the UK (And beyond).

ISBN 1 898394 21X **Edition 18: Complete set £14.75**

Fault indexes on disk - Version 1.4

Our **largest ever** fault index database on disk, Covering a massive **17,250 !!** Television, Video, Camcorder, Satellite, CD & Monitor faults listed in **16 years** of **Television.** Packed with features and complete with manual, the database provides an **EASY** way to locate faults **FAST.** Requires PC or compatible (Supplied on $3^{1}/_{2}$" hd)

Version 1.4: Indexes on Disk £17.50

Low cost updates are available for all fault indexes.

NEW RELEASE - Equivalents guides - 2nd Edition.

The long awaited 2nd Edition of our equivalents guides now available, Over **6,300** entries - **Equivalents covering Video, TV, Camcorder & satellites plus TV model-chassis guide.** This single comprehensive book contains all **FIVE** guides.

Edition 2: Equivalents guides £5.95

PLEASE NOTE OUR NEW ADDRESS

E.C.S. (Est 1985)
Technical Publishing

316, Upton Road
Noctorum, Wirral,
Merseyside. L43 9RW
Tel/Fax: 0151-522 0053

Please add £1.75 P & P to total (Europe £2.75, r.o.w please enquire).

Technical Information Services

76 Church St, Larkhall, Lanark ML9 1HE

N.B.: There is a £2.50 Post/Handling Charge on all orders

Send an SAE For Your *Free* Quote & Catalogue

We have the world's Largest Selection of

VISA **SERVICE MANUALS** Access

CD-ROMS COLLECTIONS OUT SEPT '97 — NEW CATALOGUE OUT NOW

VCR CIRCUITS £8.00 CTV CIRCUITS £6.00

CTV CIRCUIT COLLECTIONS

Ferguson from 1980's till present @ £45.00 • Bush £22
Hitachi £45 • Mitsubishi £38 • Panasonic £30...etc...

Call for full list & prices of all 27 collections

Tel: 01698 883334/884585 □ Fax: 01698 884825

TOP SELLING BOOKS

PRACT' VCR or TV REPAIRS
£16.95 each (or £30 for Both)
MICROWAVES: ENERGY & OVENS
£12.95
Data Reference Guide (Chassis/X-Ref)
£9.95
KUXO' SCRAMB' SYS' (New 5th Edn.)
£35.00
Buy, Sell & Service Used CTV/VCR/CD
£9.95 each
IC DATA BOOKS – Various Titles
£12.95 each
With 100's of Titles, send SAE for Full List

SERVICE MANUAL LIBRARY

BUY *ANY* MANUAL FOR £10.00 or Swap at £5.00 Each (plus p&p)
Initial Joining Fee £65.00
(£20/annum, thereafter)
.....oOo.....
NEW RELEASES:

3.5" Disk Drives (Installation & Circs):	£9.50
Data Ref' on 3.5" Disk:	£5.00

WANTED

SURPLUS / REDUNDANT
ELECTRONIC COMPONENTS WANTED
ICs – Tuners – Transistors – Valves – Diodes Etc
Any quantity considered
NJM General Trading
Tel: 01902 429022
Fax: 01902 429052

FOR SALE

Gamma UK Ltd

WORKING FRONT LOADING VIDEOS
READY TO SELL

Standard Play	–	£32
Long play	–	£37
Nicam	–	£45
Working Fast Text CTV's from		– £40
Portable F.S.T. Text CTV's from		–£65

ALL PRICES PLUS VAT

0121 458 4093

THE "HOOKINGS" INDEX

More than 12,000 entries including remedies, where appropriate, from "TELEVISION" magazine.

Bang up to Date: Jan '87 to Sept '97

Only £10.00 inclusive for the set of three books covering TV, VCR, SAT, CD etc.

Too good to be true?

Ring 01766 522444 for free sample.

★★★★★★

REPAIRS

accént
TECHNIC
CAMCORDER REPAIRS
Collection and delivery anywhere in the UK.
All makes, fast service.
Phone free for details.
Fax: 01905 796385
(0800) 281009 VISA

MISC.

TEST EQUIPMENT
Frequency counters, bench PSU's wow/flutter meters.
OSCILLOSCOPES from £100
PAL VECTORSCOPE
unused £400*
01922 31411
*One only

RELAY DMAGH LTD COMPUTER SOFTWARE

DO YOU RENT TELEVISIONS?
DO YOU STILL USE A CARD SYSTEM?
DO YOU FIND IT DIFFICULT TO KNOW YOUR ARREARS TOTAL AT ANY GIVEN TIME?
If you do then we recommend our computer TV and Video Rental package.
This package includes
★ automatic updating of each customer's record
★ alphabetical print-out of each customer's arrears and payments missed
★ total arrears immediately available
★ easy to use and operate.

NEW HIRE PURCHASE PROGRAMME NOW AVAILABLE AS WELL.
These programmes operate on all IBM compatibles running under MS-DOS. Free demonstration discs available.

CONTACT **WILLIAM J THOMPSON**
Donaghanie Post Office
Beragh Co. Tyrone
Telephone Beragh 58214 (0662 7)

CLASSIFIED TEL:0181 652 8339

WANTED
TV/VIDEO/SATELLITE ENGINEER
Most areas
Do you want lots more private work
£500 – £1,000 PW
01933 227327
To find out more, evenings please 5pm – 8pm Thank you

TV-AUDIO-VCR Experience?
Bench Engineer required
Salary £14-16K
Depending on experience
(Birmingham area)
Tel: 0121-706 9900
Fax: 0121-706 6688

DUE TO FURTHER EXPANSION
SERVICESPEED SLOUGH
Require
FIELD/BENCH TECHNICIAN
AND TECHNICAL INSTALLERS
For the repair and installation of CTV/VCR/Audio and Camcorder products
Top rates of pay
Tel: 01753 692408
For further details

DSC ELECTRONICS
GLASGOW
require
BENCH TECHNICIAN
for the repair of TV/Video and Audio equipment
Attractive salary for successful applicant
Tel: 0141 941 3711
For further details

Technical Advice Engineer

Surrey
Attractive package

Philips is the leading European brand in Consumer Electronics, outselling any other company in TV and producing more video recorders in Europe than anyone else. Philips Consumer Electronics has invented more new consumer technologies than any other manufacturer including compact cassette, domestic video recorders, compact disc and the first affordable widescreen TVs in Europe.

Do you have a high level of technical expertise on consumer electronic products coupled with relevant practical experience? Perhaps from an Engineering background, with a technical qualification (HNC/HND or equivalent preferred) with a keen sense of providing quality customer service. Are you searching for something different?

We are looking for a Technical Advice Engineer to provide a high level advisory service to external engineers in relation to repairing the entire range of consumer electronic products. You will also be responsible for maintaining service information files and ensuring that they are complete and up-to-date.

Your technical expertise supported by our worldwide computerised systems will enable you to provide engineers with highly technical and detailed information. As the majority of time is spent in customer liaison, confidence, a professional approach, an excellent telephone manner and the ability to cope under pressure, are essential. We offer a competitive salary and benefits package in line with that which you would expect from a leading blue chip company.

Interested? Then forward your CV with a covering letter and details of your current salary to: Conrad Ellison at Lansdowne, Rosedale House, Rosedale Road, Richmond, Surrey TW9 2SZ. Fax: 0181 332 6902. Or e-Mail lansdowne@dial.pipex.co

To discover more about Philips Consumer Electronics; http://www.philips.co

Let's make things better.

Philips Consumer Electronics

PHILIPS

IF YOUR COMPANY HAS A VACANCY
For Experienced TECHNICIANS Or ENGINEERS Etc
Why not let TELEVISION help you find the right person by placing your recruitment advertising with us
For Further Information Call PAT BUNCE on
Tel: 0181 652 8339
Fax: 0181 652 8931

Copycats

Broadcast Video Facilities
has a vacancy for a

VHS SERVICE ENGINEER

We are a busy broadcast dubbing facility in West London, operating a wide variety of broadcast and professional VTR's. We are seeking a service engineer to maintain our complement of 300 VHS recorders. The successful candidate will require considerable practical experience together with the ability to work unsupervised to maintain the machines to the highest standard. A knowledge of NTSC and SECAM television systems would be an advantage but not essential.

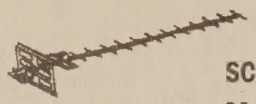
Apply in the first instance to:
Juliet Walker, Copycats Video Ltd,
The Metropolitan Centre, 26 Derby Road,
Greenford UB6 8UJ
Tel: 0181 813 2222

CLASSIFIED TEL:0181 652 8339

SPARES AND COMPUTERS

H.S.WHOLESALE

Unit B3. Citadel Trading Park,
Garrison Road, Hull HU9 1TQ
Tel: 01482 222295/Fax: 222213



AERIALS FROM 1-99

CABLE FROM 8-95

RG6 SAT CABLE FROM 11-95

SCART/SCART 21 PIN LEADS 89p
2M FLY LEADS 35p
CABLE CLIPS
'F' CONNECTORS
COAX PLUGS
POLES
BRACKETS
LASHING KITS
BOLTS
SADELTA
TV/SATELLITE METERS
NOW IN STOCK

SAT SYSTEMS ALL PACE RECEIVERS POA
LNB'S FROM £16.95
STOCKISTS FOR:
ANTIFERENCE
COASTAL
LABGEAR
LENSON HEATH
MERCURY
TELEVES
TRIAX
TOWER
BLAKES
PACE
WOLSEY
UNIFIX
PHILEX
& MANY MORE

CALL FOR CATALOGUE OF FULL RANGE
ALL PRICES + VAT + CARRIAGE + CREDIT CHARGE IF APPLICABLE

BUSINESS FOR SALE

RCS VARIABLE VOLTAGE D.C. BENCH POWER SUPPLY

£76 INC VAT – POST & INS £6
Up to 38 volts DC at 6 amps continuous, 10 amps peak
Fully variable from 1 to 38 volts.
Twin voltage and current meters for easy read out.
240 Volt AC input. Fully smoothed.
Size 14½"x11"x4½". 20 volt 1 amp model £44. Post £4.
RADIO COMPONENT SPECIALISTS
337 WHITEHORSE ROAD, CROYDON, SURREY, UK
Tel: 0181 684 1665
Lot of transformers, high volt caps, valves, speakers, in stock. Phone or send your wants list for quote.

TV & VIDEO WAREHOUSE

Working T/Text inc R/C from £26.00
Working Videos from £25.00
Working Portables from £30.00
Delivery arranged small/large quantity
Manchester
0161 736 6333

TRANSFORMERS

TV LINE OUTPUT TRANSFORMERS

PHONE: 0181-948 3702 FAX: 0181-332 0583

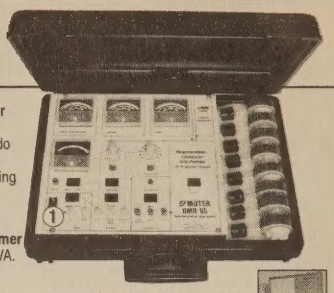
ALBA · AMSTRAD · BUSH · DECCA · DORIC · BLAUPUNKT · FERGUSON · FIDELITY · GEC · GRUNDIG · GRANADA · HITACHI · HINARI · INDESIT · ITT · KIMARA · NIKKAI · MATSUI · MURPHY · OSAKI · NORDMENDE · LOEWE-OPTA · PANASONIC · PYE · PHILIPS · SANYO · SAISHO · SHARP · SONY · SOLOVOX · SUSUMU · TANDBERG · TELEFUNKEN · THORN · TRIUMPH · THOMSON · GOLDSTAR · BINATONE ·

FULL RANGE OF KONIG: VIDEO HEADS, BELT KITS, IDLERS, PINCH ROLLERS, TENSION BANDS. LARGE RANGE OF REMOTE CONTROLS IN STOCK

TIDMAN MAIL ORDER LTD · 236 SANDYCOMBE ROAD · RICHMOND · SURREY · TW9 2EQ
Approx. 1 mile from Kew Bridge.
Mon-Fri 9 am to 12.30 pm & 1.30-4.30 pm

TEST EQUIPMENT

MÜTER

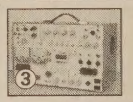


❶ **BMR 95 unique Regenerating-Computer and Analyser** for CRTs, regenerates picture tubes even better, also if all other machines do not suceed, removes short filament-cathode-grid 1-grid 2, with FLASH-EX against remaining gas, 162 adapters available, list with 12.500 tubes-types, pays itself within 4 weeks.

❷ **RTT 3 Safety isolated variable Transformer** input 220/230 V, output 0-270 V / 4 A, 1100 VA.

❸ **AT 2 audio multi-function tester,** substitutes 16 devices, has all usual sockets, cuts down repair time, takes you through all necessary test-steps by button controls.

❹ **CBE Screen-Demagnetiser** with strongest field for screens up to 110 cm, 220/230 V, 2.7 A, 600 VA.



Ask for free catalogue
S.E.M.E. Ltd., Melton Mowbray, Leicester
Phone (0 16 64) 65392, Fax 63976
IRL: Dönberg Electronics, Ranafst, Co Donegal
Phone (0 75) 4 82 75, Fax 7 10 31
Germany: U. Müter, Fax 0049 2368 57017

WANTED

B. BAMBER ELECTRONICS

5 STATION ROAD, LITTLEPORT, CAMBS CB6 1QE
Phone: 01353 860185 Fax: 01353 863245

British 3 pin plug top power supplies with transformer, rectifier, smoothing capacitor and regulator built in. The input is 230v and the output is 6v at 100mA. The unit has a 1.2m output lead to 2.5mm power plug, £1.50 each.
Thyristor modules Type IRKT2612, 1200v at 25A, £7.00 each.
Stud rectifiers Type MRF7535, 35v at 60A, ¼" UNF. less nuts, £1.25 each.
Transistors Type 2N3055E, 60p each
2N6290, NPN, TO202 65W, 40p each.
BD240, PNP, TO220, 30W, 30p each.
BD438, PNP, TO220, 36W, 30p each.
CMOS Low Power Timer IC Type TLC555, 40p each.
Bridge rectifier Type WO8, 800v at 1.5A, £1 for 10.
Diodes Type 1N4007, 1kv at 1A, £1 for 50.
Regulators LM723CN +2v to 37v, 15mA, 27p each.
LM317K, TO3, +1.2v to +37v, 1.5A, £2 each.
LM7905CT, –5v, 1.5A, 36p each.
LM340A, 48p each.
LM7815CT, 15V, 1A, TO220, 42p each.
UA7812, 12v, 40v each.
SupSer Twist Graphics Blue Mode LCDs 320x240 Pixel Size, 132x103 Overall, £5 each.
Densitron Liquid Crystal Displays, 5 Digit, Type LSH5060RP, £1 each.
Bridge Rectifier Type W01G, 100v at 1.5A, £1 for 10.
Power Diodes Type 1N5392, 100v at 1.5A, £1 for 30.
LTC1062CN8, 5th Order Low Pass Filter, 8 pins, £2.25 each.
CD4040BCN CMOS, 20p each.
TL082, Dual Bi-FET Operation Amp, 8 pin, 30p each.
LM324N Quad Op-Amp, 14 pin, 20p.
Zenner Diode 270v at 3W, 20p each.
Proximity switches for doors and windows, surface mount, £1 each.

MAIL ORDER ONLY
DELIVERY FREE, MIN ORDER £10. NO VAT

BILLINGTON EXPORT LIMITED
Billingshurst, West Sussex RH14 9EZ

VALVES WANTED FOR CASH

(KT88 £60, PX4 £50, PX25 £105, DA100 £90, EL34 £15, EL37 £15, CV4004,ECC83 £3)
Valves must be Mullard/GEC/West European to achieve the prices mentioned. ⋆ We will always equal any genuine rival offer on the above valves ⋆
Ask for our free Wanted List.

WE SUPPLY VALVES, C.R.T., VIDICONS ETC

Visitors, please phone for an appointment, we're a very busy export warehouse.
Tel: (01403) 784 961
Fax: (01403) 783 519

WANTED
PROJECTOR TV'S
VIDEO PROJECTORS
Tel: 0121 354 2393
Fax: 0121 355 0108

LINAGE

AVO MULTIMETER Model 8: £45.00. 500 volt megers: £30.00. Prices plus VAT and p&p. Send SAE for lists of Surplus Instruments and Scopes, etc. A. C. Electronics, 17 Appleton Grove, Leeds LS9 9EN. Tel: 0113 249 6048.

OCHRE MILL Technical Services, Grundig TV spares for most models to 1985. Fast, friendly, helpful, sensible prices. Gt Lype Farm, Charlton, near Malmesbury, Wilts SN16 9DR. Tel: 01666 823228.

PRIVATE RETAILER has excellent part exchange colour televisions and videos to clear. Tel: 01494 814317.

DECODER TO COMPUTER interface card with smart card connectors and diagram: £9. E.M.O., 62 Bridge Street, Ramsbottom, Lancs BL0 9AG. Tel: 01706 823036.

CLASSIFIED
Telephone
0181-652 8339
Fax:
0181-652 8931

CLASSIFIED TEL:0181 652 8339

SENDZ COMPONENTS 01702 332992 & 338894 To order see BACK PAGE

ADAPTOR-KEYBOARD MAINS 12V 800MA £5.00
BENCH LAMP-FLUORESCENT
WITH MAGNIFIER P/P £5.00ea £50.00
BENCH POWER SUPPLY VARIABLE
0-30V 3A-TWIN METERS P/P £5.00ea £50.00
BLOCK CONVERTER – B SKY B – VHF TO IF 50p
BRIDGE RECTIFIERS 10 FOR £1.00
BURGLAR ALARM KIT full description £7.00
BURGLAR ALARM KIT . . . send for data . . .
MAIN CONTROL PANEL £12.50
BURGLAR ALARM SIREN 12 VOLT 50p
CAMCORDER-UNIVERSAL BATTERY 9.6V –
1400MA FOR JVC-PANASONIC-PHILIPS £9.50
CAMCORDER-TRIPOD SHOULDER POD £5.00
CAPACITORS:-
1IN/2KV, 2NZ/2KV, 4NZ/4KV EACH 15p
5N6/2KV, 6N2/2KV, 9N1/2KV EACH 15p
35V-22UF, 50V-4. 7UF, 50V-100UF EACH 25p
COMPONENTS (MIXED) – BUY BY WEIGHT
1lb for £1 . . . 1lb for £1 £1.00 per lb
P/P £1.25 per lb
CRYSTAL-4MHZ OR 6MHZ EACH 30p
CRYSTAL-TV-4.4MHZ OR 8.8MHZ EACH 30p
DESOLDER PUMP £2.00
DIGITAL CAPACITANCE METER – CMC200
200PF-20MF £28.00
DIODES-TV-100 MIXED £3.00
FILTERS – 455 & 480 EACH 20p
FOCUS POTS-K40 £2.00
FRONT PANELS (PLASTIC) FOR AMSTRAD,
PERDIO, FIDELITY, DECCA, TATUNG
ALL 1992 MODELS EACH £4.00
FUSES-100 MIXED £3.00
GAS SOLDER IRON-PORTASOL HOBBY £10.00
HANDSETS-SEE SEPARATE LISTING
INFRA RED DETECTOR
WIDE/SHORT ANGLE WITH RELAY £8.00
INFRA RED RECEIVER-MATSUMI MINIATURE £1.00
LOPTs – SEE SEPARATE LISTING
MAGNIFIER – 2X AND 4X £3.50
MILLI VOLTMETER-ELECTRONIC-LEADER
LMV-181A 40V A/C IN-1MV F/S
1MV-300V CALIBRATED – COST £225.00 £35.00
MIXED COMPONENTS BY WEIGHT
1lb. FOR £1 . . . 1lb. FOR £1 £1.00 per lb
P/P £1.25 per lb
MODULATOR-TUNABLE SATELLITE-TV £1.00
MODULATOR KIT, 5V TO 12V –
FOR ALL CAMERAS £5.00
MOTORS – SEE SEPARATE LISTING
PANEL-CM201 £10.00
PANEL-IK2-FM2211 STEREO £5.00
PANEL-CVC80-POWER £5.00
POSITOR-2322 662 98009 50p
POSITOR-2322 662 98012 50p
POSITOR-3 PIN PO5.PTH451 BLACK TYPE 50p
POWER SUPPLY –
12V DC & 24V DC-REGULATED £2.00
POWER SUPPLY-REGULATED 3-12V 500MA £5.00
PSU AC 12V 500MA £1.00
PSU AC 9V 1A £1.50
QUARTZ HALOGEN –
500W 200V FOR OUTDOOR LAMPS £1.00
R.S. SAFE BLOC £5.00
RELAYS-SUB MINIATURE 25p
SATELLITE TUNER UNIT – 2427611
. . . . BASE BAND/VIDEO OUT £6.00
SCART TO 4 PHONO LEADS 1.5M £4.00
SCART TO 6 PHONO LEADS £6.00
SCART TO "D" PLUG £1.00
SCART TO SCART LEADS –
ALL PINS CONNECTED – 1.5 METRES £2.00
SOUND 5.5MHZ MPM 1000T £1.00
SOUND 6.0MHZ MPM 1040 £1.00
TRANSFORMER-RS ENCAPSULATED MAINS
0-120V-0-120V PRI 0-9V-0-9V SEC £1.00
TRIPLER BG 2032-642-3002 £7.00
TRIPLER BG 2087-642-1005 £7.00
TRIPLER KT3/K30 £4.00
TRIPLER – UNIVERSAL £5.00
TUNERS – SEE SEPARATE LISTING
TUNING POTS – 8 WAY 50p

AMSTRAD

DISPLAY PANEL – LONG CHASSIS – 1992/93 £4.00
FRONT PANEL FOR ALL 1992 MODELS £4.00
HEAD AND DRUM – 6000 £12.00
HEAD AND DRUM – NICAM £12.00
PANEL-CLOCK DISPLAY – 8.900 £5.00
PLASTIC FRONT WITH FLAP – 8.900 £3.00
POWER SUPPLY-VS1000-VS1100 £5.00
POWER SUPPLY, LONG OR SHORT CHASSIS
1991/1992 MODELS £3.00
POWER SUPPLY – SWITCH MODE
– DOUBLE DECKER £5.00

ETRI

FAN – 6in 240V £5.00

FARNELL

POWER SUPPLY – SWITCH MODE, IN CASE
5V 6A, 12V 3A, 12V 1A X 2, SMALL £10.00

FERGUSON

ADAPTOR – VPT – TEXT – VA354 £5.00
ADAPTOR-CHARGER –
AC MAINS & BATTERY-VA365 P/P £3.00ea £20.00
AMPLIFIER-TV-2 WAY GAIN 7DB – ICC7 £8.00
CAMCORDER BATTERY 6V-1400MA-VA366 £5.00
CAMCORDER BATTERY, HIGH CAPACITY
9.6V 1800MA-VA310 £4.00
CAMCORDER CAR ADAPTOR CHARGER –
AND BATTERY-VA308 £20.00
CAMCORDER LENS 2 OFF –
TELE-CONVERSION LENS x1.4 & x0.7 £6.00
CARDIOID CAMERA MICROPHONE-VA SUPER
218 TELESCOPIC BOOM & STAND £12.50
CHASSIS-TX80-NEW-NO TUNER P/P £5.00ea £15.00
CHASSIS-TX100 VHF/UHF
YELLOW SPOT AND SECAM P/P £5.00ea £20.00
CHOKE-MAINS INPUT-TX9-TX10 £4.00
CHROME BOARD-ICC5
I/Cs U4647TKF OR HA11498 £6.00
CONVERTOR-RGB-S-VHS – VA341 £20.00
DECK AND CAPSTAN MOTOR:-
FV61LV, FV62LV, FV67LV, FV68LV EACH £30.00
FV70B, FV71LV, FV72LV, FV74LVX EACH £30.00
FV77HV £30.00
DECK AND HEAD-FV31R £25.00
DECK MECHANISM
VIDEOSTAR-R2000 P/P £5.00ea £30.00
DRUM-LOWER-PDM2024A-1 £20.00
DRUM-LOWER-PUS362931-2 £30.00
DRUM-UPPER-20439318 £20.00
DRUM-UPPER-YDM2018B £10.00
DRUM-UPPER-YDM2037A £20.00
HEAD-FV3IR £12.00
HEAD AND DRUM-FVZ1A £15.00
MODULATOR-SP212315 £5.00
MODULATOR-SRB1 25p
MODULATOR-SATELLITE-T1040-SRD3/4 £2.00
PANEL-TX89 £10.00
PANEL-10 MIXED FROM TX9 TO ICC5 £20.00
PANEL-DECODER-ICC5 £5.00
PANEL-FRONT-TX98
T1353E W/INFRA-RED RECEIVER £5.00
PANEL-FRONT-TX100 £4.00
PANEL-IF-TX9, TX10 £4.00
PANEL-REMOTE AND POWER SUPPLY
FV31R DISPLAY P/P £2.00ea £5.00
PANEL-REMOTE-TX9, TX10 EACH £5.00
PANEL-REMOTE-TX10-540/01 £5.00
PANEL-REMOTE-TX10, WITH BATTERY
AND 4 I/Cs – 1544-033C £7.00
PANEL-REMOTE TX90 –
139.001 I/Cs M293B1 AND MS1000 £10.00
PANEL-REMOTE TX100
I/C M293B1-SAA5012 £10.00
PANEL-REMOTE TX100
WITH STAND-BY BATTERY AND I/Cs £10.00
PANEL-T1228B TEXT
FOR TX89, TX98, TX99, TX100 £15.00
PANEL-TX90 THORN FRONT –
– 8 BUTTONS 01M4-515-002 £10.00
PANEL-TUBE BASE-ICC5 £5.00
PANEL-TUBE-BASE-TX89, TX98, TX99 £5.00
PANEL-TUNING 1509G-TX9,TX10 £5.00
POWER SUPPLY 12V-3A
FOR VIDEOSTAR CAMERA PP3 £4.00
PUSH BUTTON UNIT-TX85, TX86 – 8 BUTTONS £5.00
RECEIVER – INFRA-RED – ICSL486-TX100 50p
TRANSFORMERS-SWITCH MODE:-
TX85, TX86, TX89 EACH £4.00
TX100 £5.00
473190-00, 40153000 EACH £5.00
ICC5 3112-338-326842 £4.00

GRUNDIG

TRIPLERS BG2032-642-3002 £9.00
TRIPLERS BG2087-642-1005 £9.00
TRIPLER WITH FOCUS POT £7.00
UNIVERSAL TRIPLER – UPRIGHT
PRINTED CIRCUIT TYPE £9.00

HITACHI

DECODER-TELETEXT PC232A5 – ISSUE 4 £15.00
HEAD AND DRUM – 620E £12.00
MAINS SWITCH WITH STAND-BY 50p
MODULATOR No 5587881 £5.00
OSCILLOSCOPE 20MHZ DOUBLE BEAM –
V212 £188.00
PANEL-TELETEXT G8P – ISSUE 6 £10.00
PANEL-TELETEXT PC315-11 – ISSUE 7 £15.00
PANEL-TELETEXT PCB F.S.T. – ISSUE 6 £15.00
PANEL-TEXT-VT753E £20.00
POWER SUPPLY TV SWITCH MODE
STR 4211 ISSUE 10 £8.00
POWER SUPPLY VIDEO SWITCH MODE
VTM312ELM £10.00
THICK FILM-HM9204A £3.50
THICK FILM-FRAME OUTPUT & GEC-6251 £9.00
TRANSFORMER-SWITCH MODE-470036-70 £5.00
TRANSFORMER-SWITCH MODE-473187-01 £5.00
TRANSFORMER-SWITCH MODE-473332-00 £5.00

HOSIDEN

TUBE BASE – 8 PIN – EK0353 50p

I.T.T.

IF MODULES:-
5827-01-51, 5827-03-51 EACH £8.00
5828-04-10, 5829-02-58 EACH £8.00
5929-03-41 EACH £8.00
PANEL-TTT FRONT-CMC115 £6.00
PANEL-TTT FRONT-SEL IBF 300 £10.00
PANEL-TTT FRONT-SEL IFB 150 U.K. £10.00
PANEL-TTT FRONT-SEL IFB 194P £6.00
PANEL-TTT FRONT-SEL69112407= CMC303 £6.00
TELETEX CONVERSION KIT £8.00

MATSUI

DECK AND HEAD-VP9501 P/P £5.00ea £20.00
DECKS WITH HEADS –
3000/ORION P/P £5.00ea £16.00
HEAD-VCR-VX3000 £10.00
HEAD-VSR1500 = ORION D2096 £5.00
PANEL-MAIN-VSR1500 P/P £5.00ea £3.00
POWER SUPPLY-VSR1500 £5.00
POWER SUPPLY & REG –
TYPE STK5343-VP9501 £8.00
POWER SUPPLY-SWITCH MODE-1500 £3.50

ORION

MODULATOR-VIDEO MDLK 6B513A £2.50
MODULATOR-MDF33 UB360D £3.00

PHILIPS

DECODER-TEXT-K40-KT3 £10.00
IF PANEL FOR CP90-CP110 £5.00
INFRA-RED RECEIVER – HAND SET TESTER £1.00
SOLDER IRON 25W-240V £6.00
TRANSFORMER-3111-268-30050 £3.00
VIDEO REPAIR KIT-31037289 £10.00

TEXAS

NICAM BOARDS MK II £10.00

TUNERS

IF TERC8-022A TBJZ4-00ZA-ALPS £7.00
SATELLITE SXT2302180968 £3.00
SATELLITE
WITH BASE BAND MIN SXT2302234 £4.00
SMALL UHF/VHF £3.50
VHF/UHF – TEKE4-112A £4.00
4944 £3.00
U321, U341, U342, U343 EACH £5.00
U344, U411, U412, U944 EACH £5.00
U743, U744 EACH £3.00
AMSTRAD
UE33-BO1 £3.00
FERGUSON
IF2105-RE £5.00
MTP2011-AP00 £5.00
UHF – ICC5 £5.00
VHF – ICC5 £5.00
TX85, TX86, TX89, TX90 EACH £4.00
TX98, T99, TX100 EACH £4.00
ORION
1500 – UE33 BO9 £4.00
PANASONIC
SMALL UHF/VHF £3.00
SANYO
UHF/VHF TDO 124EB £4.00
SHARP
TUNER AND IF 1810587 PA1 UK £3.00
TATUNG
UNIVERSAL 205 OR EQUIVALENT
WITH AERIAL SOCKET £8.00

MOTORS

MOTOR – CASSETTE TYPE
12V WITH SPEED CONTROL 50p
AMSTRAD
LOADING-6000 £3.00
CANON
12V MOTOR 50p
HITACHI
CAPSTAN – ACE G4-B to ACE G40-B £10.00
MICROWAVE TURNTABLE MOTOR £10.00
MATSUI
CAPSTAN VSR1500 I/C NO. M56730 ASP £15.00
MITSUMI
MOD MRF7-UF32 £5.00
MOD TMUG3-103A £5.00
MITSUBISHI
CAPSTAN-HSE41-I/C M51782ASP £4.00
ORION
MOTOR 50p

HANDSETS

CPT1408T, CPT2176, CPTZ178 EACH £5.00
CPT2476, CPT2478 EACH £5.00
TEXT. REPLACES PHILIPS
KT3, K30, K4 ETC. £9.00
UNIVERSAL, REMOTE TV1, TV2, VCR –
SAT, AUX, LCD, VIDEO, TV –
ALL NEW 10 MIXED FOR ONLY £15.00
AMSTRAD
EXPORT £3.00
4600 £3.00
4700 £5.00
6000 £15.00
6800 £4.00
UNIVERSAL £3.00
DECCA
NICAM LCD £4.00
FERGUSON
BSB £1.50
FV41R/3V59 £20.00
FV41R/FV42 £20.00
ICC5 £5.00
IK2000, IK7000 EACH £5.00
SRD2, SRD3, SRD4 EACH £1.00
T780 £2.00
TV/SATELLITE WITH FST £3.00
HITACHI
CPT2158 (NO REPLACEMENT) £5.00
VIDEO RM933E VIDEO PLUS £30.00
CLE874B £5.00
CLE883A = IR8512, CPT2196, CPT2578 £8.00
TV MODEL C2558 (IR1820)-CLE883A £10.00
MATSUI
1500 £5.00
VSR1500 £4.00
VX3000 £3.00
3000/ORION – TV AND VIDEO £2.00
RC = PACE 900, FERGUSON, SONY, GRUNDIG £5.00
MITSUBISHI
RM35 – VIDEO £5.00
RM45 – VIDEO £7.00
NOKIA
RC202 £4.00
ORION
TV AND VIDEO £2.00
VIDEO WITH LCD – 1992/93 MODELS £5.00
PANASONIC
EUR51142 £10.00
TC1632, TC1642, TC2232 EACH £8.00
TX2034, TX2044, TX2200, TX2234 EACH £8.00
TX2244, TX2300, TX2636, TX3300 EACH £8.00
RC201 – TV – REPLACES TNQ1411/2 £8.00
PERDIO
PV 1188 £3.00
PHILIPS
NEW TYPE UNIVERSAL £10.00
RC4001 £10.00
SANYO
UNIVERSAL VIDEO £3.00
SIEMENS
TV/VIDEO – 1994 MODEL £5.00
THORN
9000, 9600, TX9, TX10, TX100
TEXT AND NON-TEXT EACH £10.00

L.O.P.T.

36061, 36162, 36362, 36383, 36481 EACH £10.00
36482, 36761, 36831, 36832, 36922 EACH £10.00
36943, 36962 EACH £10.00
2432211, 2432351, 2432491, 2432851 EACH £10.00
2432871, 2432981, 2432984, 2433752 EACH £10.00
2433952, 2434002, 2434141, 2434393 EACH £10.00
2434451, 2434492, 2434494, 2435012 EACH £10.00
2435013, 2435016, 2435062, 2435063 EACH £10.00
2435064, 2435066, 2435085, 2435121 EACH £10.00
2435372, 2435701, 2436771, 2436773 EACH £10.00
2436792, 2436795,2436797, 3216001 EACH £10.00
3220029, 3714016, 47003481 EACH £10.00
AT2076/78, AT2076/88, AT2078/25 EACH £10.00
AT2077/81 £15.00
DST81N243/472593-00 £10.00
DST85B235/47328700 & /40153200 EACH £10.00
DST88N234/400086AD, & /47805200L EACH £10.00
DST88N234/47320041, & /47317590 EACH £10.00
DST186N243/473058-00 £10.00
TFB3035D, TFB3069D, TFB4023AD EACH £10.00
TFB4039AD, TFB4066AD EACH £10.00
FERGUSON
TX9 £4.00
TX10 £6.00
TX85, TX86 EACH £8.00
TX89, TX98, TX99 EACH £12.00
Y260781 £8.00
FSTY260482 £10.00
LOPT BLUE SPOT £10.00
LOPT RED SPOT £6.00
LOPT WHITE SPOT & YELLOW SPOT EACH £8.00
PANASONIC
TC2203, TLF 1456B EACH £15.00
TLF1457B, TLF701/6 EACH £15.00
TOSHIBA
TFB 3035D, TFB 4023AD, TFB 4032BD EACH £10.00
TFB 4038AD, TFB 4110AD EACH £10.00
TFB 3089D, TFB 4088AD EACH £8.00

7805	20p	2SD1432	£1.00	BU208A	£1.50	BUW84	60p	BYX38/300	25p	HGA1124A	50p	SGSIF344	£1.00	TDA2611A	£1.00	TDA3654	£1.00	TEA1060	£2.00
7806	20p	2SD1453	£1.00	BU208D	90p	BUX39	£1.00	BYX55/350	10p	HM6264		SN96551NL	£3.00	TDA2613	£1.00	TDA3654Q	£1.00	TEA2014A	60p
7809	20p	2SD1576	£1.00	BU222	£1.00	BUX84	50p	BYX55/600	10p	ALP-15	£3.50	SS2000AF	£1.00	TDA3047	£1.00	TDA3710	£3.00	TEA2029C	£3.00
7812	20p	2SD1577	£2.00	BU326	£1.00	BUX84AF	50p	BYX71/60	20p	IK7ST		ST6385B1/		TDA3048	90p	TDA3800	£2.00	TEA5620	£2.00
7812F	20p	2SD180T03	15p	BU407	40p	BUY49	20p	BYZ106	10p	6391 B1	£3.00	/BFY	£2.00	TDA3083	£2.00	TDA3803A	£4.00	TIPL361A	90p
2SC940	£1.00	2SD1878	£1.00	BU508A	90p	BY187	5p	BZW-C110	5p	IN5401	3p	ST6393		TDA3180	£2.00	TDA4260	50p	TMP47C634N/	
2SC3795	£1.00	AN5521	£1.00	BU508AF	£1.00	BY208-800	8p	BZW83-C20	3p	IR106A	10p	B1/1M	£3.00	TDA3190	£1.00	TDA4420	£2.00	/2685	£1.00
2SC3973B	£1.00	AN5551	£1.00	BU508D	90p	BY228	15p	CA3123Q	50p	L298N	£4.00	STK4793	£5.00	TDA3505	£3.00	TDA4439	£2.00	TMP47C834N	
2SC4313	£5.00	AN5831	£2.00	8U508DF	£1.00	BY229	6p	CD4555BE	20p	LA7830	£1.00	STR4211	£3.50	TDA3506	£3.00	TDA4501	£3.00	R 107	£3.00
2SC4589		BC550C	20p	BU705	£1.00	BY255	5p	CLE871A	£5.00	LA7831	£1.00	STR4420	£5.00	TDA3560	£2.00	TDA4505NE	£3.00	TMS27PC256	
10A/1500V	£2.00	BDV648	50p	BU801	50p	BY299-200	15p	FE3B	4p	M708 ABI	£1.50	STR6020	£3.00	TDA3561	£3.00	TDA4600	£3.00	-2NL	£2.00
2SC7350	15p	BDV658	50p	BU806A	£1.00	BY299-800	30p	HA1140	£1.00	M708 LBI	£1.50	STR6602D	£4.00	TDA3561A	£3.00	TDA4601	£2.00	UPC1378H	£1.00
2SD200	£1.00	BF869S	20p	BU807	50p	BYT71-800	15p	HA1185	£1.00	M3720HECSP	£1.00	STR58041	£4.00	TDA3562A	£2.50	TDA4650	£3.50	UPD6376CS	£3.00
2SD401	40p	BF870	20p	BU808DFI	£1.00	BYV19-30	15p	HA1196	50p	M58658P	£1.00	TA8691N	£3.00	TDA3564	£3.00	TDA5930	£1.00	ZC409233P	£8.00
2SD716	£1.00	BPW41	15p	BU824	50p	BYV28-200	15p	HA11485ANT	£1.50	MN650	£1.00	TD603P	£2.00	TDA3565	£2.00	TDA8138	£1.80		
2SD787	30p	BU105/04	80p	BU826	£1.00	BYV95B	10p	HA118041NT	£1.50	S13522V	£1.00	TDA1060	£1.40	TDA3566	£3.50	TDA8190	£3.00		
2SD789	30p	BU108	£1.00	BUK444/800	£2.00	BYV95C	12p	HA513385P1	£2.00	SAA1061	£3.00	TDA1365	£2.00	TDA3581	£3.00	TDA8349	£3.00		
2SD820	£1.00	BU124	50p	BUK445/600	£2.00	BYV96D	10p	HA51338SP3	£2.00	SAA3018	£1.00	TDA1510	£1.70	TDA3590	£3.00	TDA8417-3	£3.00		
2SD868	75p	BU126	80p	BUK454/600	£1.00	BYW20-08-9	£1.00	HCF4520	50p	SAA5010	£2.00	TDA1521A	£2.00	TDA3591	£1.00	TDA8703	£3.00		
2SD880	30p	BU180A	65p	BUT11	50p	BYW29/50	15p	HCF4520BE	50p	SAA5231		TDA1543	£1.00	TDA3592A	£3.00	TDA9403	£1.50		
2SD1264	50p	BU204	60p	BUT11AF	50p	BYW95	10p	HD61404251	50p	(TEXT)	£2.00	TDA1908A	90p	TDA3650	£7.00	TDA9503	£3.00		
2SD1266	£1.00	BU205	75p	BUT13	£1.00	BYW95C	10p	HD6140815	£1.00	SAA5240A/P	£4.00	TDA2460	£2.00	TDA3651	£3.00	TDB2033	£1.00		
2SD1398	£1.00	BU206	£1.00	BUT18AF	£1.00	BYW562A		HE4528BP	15p	SAA5241A/P	£4.00	TDA2541	£1.00	TDA3651AQ	£3.50	TDD1610S	50p		
2SD1415	£1.00	BU207	£1.00	BUT71/800	15p	100V	8p	HEF4029BP	20p	SAA5243A/P	£4.00	TDA2582	£1.00	TDA3652	£3.50	TEA1009	£2.00		
2SD1427	£1.00	BU208	80p	BUW11	40p	BYX10	10p	HEF4093	20p	SAA5246A/P	£4.00	TDA2600	£2.00	TDA3653AQ	£2.00	TEA1039	£2.00		

WE HAVE A LARGE STOCK OF VIDEO PANELS
SEND FOR LIST

PLEASE ADD 17.5% VAT TO BOTH THE GOODS TOTAL AND P/P CHARGE

Universal Remote Controls

(available from Seme Ltd)

TRADE ONLY

Economy Range

ONE FOR ALL 1
'ONE SHOT'

Order Code **REM2627**

- ►**Pre-programmed** to control all IR TV's.
- ►**Large easy** to use buttons.

Standard Range

ONE FOR ALL 3
'Little Easy'

Order Code **REM2694**

- ► **Pre-programmed** with codes to control TV and Video Recorders and Auxiliary Products
- ► **Teletext** basic features.

Premium Range

ONE FOR ALL 5
Universal Remote Control

Order Code **REM2703**

- ► **Pre-programmed** with codes to control most TV's, Video's, Satellite/cable receivers, CD etc.
- ► **Upgradeable** by Telephone, will never become obsolete
- ► **Teletext/Fastext** buttons.

ONE FOR ALL
'So Easy'

Order Code **REM2764**

NEW

- ► **Pre-programmed** to control all IR TV & Video products
- ► **Large easy** to use buttons.

ONE FOR ALL 4
'Big Easy'

Order Code **REM2693**

- ► **Pre-programmed** with codes to control all infrared TV, Video & Satellite receivers.
- ► **Teletext/Fastext** functions.

ONE FOR ALL 6
Universal Remote Control

Order Code **REM2196**

- ► **Pre-programmed** with codes to control most TV's, Videos, Satellite/cable receivers, CD & Audio products.
- ► **Teletext/Fastext** buttons
- ► **Upgradeable** by Telephone, will never become obsolete.

ONE FOR ALL Helpline: 0990 143038, 10am to 7pm weekdays.

Multi-Link Remote Control Extender

Order Code **REM2758**

Control your video and satellite receiver from two rooms with the extra Multi-link Receiver.

- ► Use existing remote control handset.
- ► Extends range of remote up to 100ft.
- ► Ideal for:- PUBS, CLUBS, HOTELS, SCHOOLS & in the home.

ONE FOR ALL Display Stand

- ► Holds up to 32 remote controls.
- ► Size: H = 40, W = 55, D = 30cm

If you purchase any 12 ONE FOR ALL remotes, we will give you a display stand and a ONE FOR ALL 'Big Easy' absolutely FREE !

A display stand can boost ONE FOR ALL sales by up to 33%

TRADE ENQUIRIES ONLY

Direct Sales Line: 01664 481818

Fax Orders: 01664 63976

Seme